

**WHY DO NATIONS BEHAVE STRATEGICALLY? :  
A GAME THEORETIC ANALYSIS OF GATT ARTICLE XXIII**

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*The purpose of this paper is to explain why nations behave strategically in the multilateral stage of GATT dispute settlement procedures. We provide two game models: One is a complete information model and the other, an incomplete information model. We show the following points: First, national size is important in explaining the nation's ex - post behaviors in the multilateral stage. Second, reputation loss is also important. Third, industry characteristics are not important. Some empirical evidence including the regression analysis is provided. As a conclusion, it is shown that the most important factor is the reputation loss accompanying unauthorized retaliation.*

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1. INTRODUCTION

With the launch of the General Agreement on Tariffs and Trade (GATT) in 1948, member countries were provided with dispute settlement procedures (DSP hereafter), which were mainly comprised of GATT Articles XXII and XXIII. According to these articles, when GATT was notified of a trade dispute, the disputing parties would engage in bilateral negotiations (Article XXII) and, if they failed to resolve the dispute, the parties would proceed to the multilateral stage (Article XXIII). However, the procedures contained in these Articles were so simple, insufficient and rough that the dispute settlement mechanism could not function well without a further elaboration of the procedures. This

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elaboration<sup>1</sup>, upon which the customary practices were developed, was the cornerstone for actual disputes that occurred under GATT. Customary practices can be summarized as follows. If bilateral consultations between member countries fail to resolve trade disputes, either country can ask GATT to establish a panel or working party. The panel or working party investigates and issues a report, which includes a legal decision and recommendations. The GATT Council then discusses whether or not to adopt this report. If this report is adopted and the offending nation does not follow the recommendations, the complainant can request that GATT authorize retaliation.

As is suggested by Hudec (1993), the dispute settlement mechanism of GATT was successful in resolving trade disputes among member countries. However, member countries did not always follow the rules and procedures outlined in DSP to the letter; and sometimes they outright violated them. For example, member countries might refuse to set up a panel or refuse to adopt a panel report, if a panel succeeds in preparing it, in the Council meeting.<sup>2</sup>

The purpose of this paper is to analyze why nations behave differently to resolve trade disputes, especially focusing on the behaviors related to the panel and Council under the GATT Article XXIII. In short, the intention of this paper is to explain why nations behave strategically in the multilateral stage (hereafter, DSPm. Subscript "m" means multilateral).

DSPm will be divided into two separate phases, the panel establishment phase and the adoption phase of a panel report.<sup>3</sup> In each phase, disputing countries choose one of the nation's "strategic behaviors," which refer to their ability to block the set-up of a panel, to block the adoption of its report, and to retaliate when one nation blocks either the set-up of a panel or the adoption of a panel report. The term "strategic" is used in that the behaviors of disputing countries in DSPm are interdependent. The choice of defending nation's behavior is dependent upon the complaining nation's behavior, and vice versa.

The models suggested below are devised to investigate why nations choose particular strategic behaviors in particular situations.

<sup>1</sup> The one of the most important elaboration of DSP is the introduction of the "panel procedure", which was adopted as a part of customary practice by 1955. However, the proposal to institutionalize this procedure was not formally adopted, mainly because GATT members preferred to preserve the existing situation and not to establish judicial procedures which might put excessive strain on GATT. Therefore, the customary practice of DSP was never codified as a GATT Article, although it was officially formalized in the Tokyo Round under the name of "Agreed description of the customary practice of the GATT in the field of dispute settlement".

<sup>2</sup> However, the current DSP of WTO, which is based on *Understanding on Rules and Procedures Governing the Settlement of Disputes*, is different from the DSP explained here. In the current DSP of WTO, the establishment of a panel and the adoption of a panel report are almost guaranteed because of the introduction of negative consensus, which means that they can be blocked only when all participating countries agree to do.

<sup>3</sup> Each phase will be analyzed in the subgames of models in the second section.

## 2. MODELS

### 2.1. Outline of Models

Two game models, which are called the DSPm game model, will be provided. In each game, there are two players: a complaining country, C, and a defending country, D. They are confronted with a dispute-resolution game described in Figure 1.

A panel is extremely important in the DSPm model since it decides which party wins (strong type) or loses (weak type)<sup>4</sup> and, thus, this decision significantly affects the behavior of disputing countries. A panel could be thought of, then, as one player of a game. Although a three-player game is not impossible theoretically, this paper will not consider it because to assign suitable payoffs to a panel is not easy, and most importantly, the DSPm game is essentially a game of only two players, the complainant (C) and the defendant (D). For this reason, this paper would like to incorporate a panel into the model by assuming a complete or incomplete information in the game. Based on this, two game models will be provided: One is an incomplete information model and the other, a complete information model. The extensive forms of two games are provided in Figures 2 and 3.

The parameters used in the models can be summarized as follows:

C: the complainant

D: the defendant

$\alpha$ : the net gain followed by a panel's decision

$\beta$ : the net gain followed by (cross) retaliation

$\gamma_1$ : the reputation loss occurring when D blocks the establishment of a panel

$\gamma_2$ : the reputation loss occurring when D blocks the adoption of a panel report

$\gamma_3$ : the reputation loss occurring when D does not comply with the recommendation of the panel report

$\gamma_4$ : the reputation loss occurring when D engages in cross-retaliation measures

$\gamma_5$ : the reputation loss occurring when C engages in unauthorized retaliation

$\gamma_6$ : the reputation loss when C takes retaliation measures in spite of its losing

NB, B: feasible actions of D, Not to Block and Block, respectively

NR, R: feasible actions of C and/or D; Not to Retaliate and Retaliate, respectively.

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<sup>4</sup> This paper will regard the party that wins as having a strong type and the party that loses as having a weak type. However, a losing nation would not always be equivalent to a violating nation. The reason is that there are some cases where the defending country should follow the recommendation of a panel even though it has not violated any provisions of GATT. They are called as cases of non-violation nullification and impairment (GATT Article XXIII). However, in this essay the losing nation will not be distinguished from the violating nation.

## 2.2. Meaning of Parameters

This paper assumes that nations would like to maximize a sum of national economic welfare and total political contributions donated by interest groups. In other words, trade policy is assumed not to be determined by a benevolent government but determined by a self interested politicians. They consider both national welfare, which is the objective of a benevolent government, and political contributions or donations, which will be used to get votes for his/her reelection. For this reason, the term of *benefits* is used instead of *economic benefits*.<sup>5</sup>

### 2.2.1. $\alpha$ : The decision of a panel and the gain or loss of disputing nations

When a panel report is released, the complaining country and the defending country will know which party wins and which party loses. If the complaining nation (C) is determined as a winner and the defending nation (D) as a loser, C may obtain some benefits and D some losses. C's benefits and D's losses can be named  $\alpha_1$  and  $\alpha_2$ , respectively.<sup>6</sup> When the decision of a panel is opposite to the previous one, C may incur some losses and D some benefits. C's losses and D's benefits are named as  $\alpha_3$  and  $\alpha_4$ , respectively. Thus, four  $\alpha$  variables (Table 1) are easily identified for the DSPm model.

For the complete analysis of DSPm, the relative size of these four payoffs and their sign (i.e., net gain or net loss) must be identified when each party is judged to win or lose. However, one of the most important features of the DSPm model is that this classification is neither necessary nor required. Even when the DSPm model is recalculated by using these four  $\alpha$  payoffs, there is no change in the equilibrium outcome.<sup>7</sup> Thus, for simplification, it is assumed that if each party is judged to win, it will gain  $\alpha$  and if loses, it will lose  $\alpha$ .

### 2.2.2. $\beta$ : Unauthorized retaliation and the subsequent gains or losses

If a country retaliates, what will be its gain or loss? By the same logic suggested above, we assign C's gain and D's gain to be  $\beta_1$  and  $\beta_3$  respectively,

<sup>5</sup> For more detailed explanation of the models based on this concept, please see Rodrik (1995), Grossman and Helpman (1994), and Magee, Brock and Young (1989).

<sup>6</sup> If D is determined to lose (GATT determines, for example, that D cut down tariff rates), it may incur some loss of tariff revenue and contributions from relevant domestic interest groups. But, it might gain some consumers surplus. We, however, do not know whether D will incur a net gain or net loss. However, the peculiarity of this model is that that kind of calculation is not necessary. See footnote 7.

<sup>7</sup> Figure 5 indicates the adoption subgame (adoption phase) of complete information game by using two  $\alpha$ , and four  $\beta$ , (since this subgame is a part of complete information game, only two  $\alpha$ , appear). An equilibrium outcome is NB, NR. If we reconstruct Figure 5 by using only  $\alpha$  and  $\beta$ , we easily find that an equilibrium outcome is the same as before, i.e., NB, NR. We find this phenomena in the complete information game as well as in the incomplete information game. We call this feature as the irrelevance of the magnitude of  $\alpha$  and the irrelevance of the magnitude of  $\beta$ .

and D's loss and C's loss to be  $\beta_2$  and  $\beta_4$ , respectively. Thus, four  $\beta$  variables for the payoffs of the DSPm model can be identified (Table 2). For the exact specification of the DSPm model, the values of six payoffs and even their sign (i.e., net loss or gain) must be identified. However, by the similar logic applied to  $a$  cases, this elaboration is not necessary. Even when the DSPm model is recalculated using the four  $\beta$  payoffs, there is no change in the equilibrium outcome (For the irrelevance of the magnitude of  $\beta$ , please see Figure 5 and footnote 8).

Therefore, for the simplification of the DSPm model, it is assumed that when each party retaliates, it will obtain  $\beta$  and its trading partner will lose  $\beta$ .<sup>8</sup> As a result, if there is cross-retaliation, no nation will win. Even if one nation wins marginally, there will be no change in the equilibrium outcome unless  $\beta$  infinitely approaches zero.

This explanation can be applied only to equal-sized countries. If there is asymmetry in a country size, the above result will not hold. When one country is too small, it cannot have retaliatory power. A small nation will incur loss of national welfare (it cannot enhance its terms of trade) and no interest group will believe that it will win because of its small size. In this case, its  $\beta$  will infinitely approach zero. Thus, if there is cross-retaliation, the small nation will always lose. For simplification, it is assumed that a nation's  $\beta$  will be zero if its size is too small. Even if small nation's  $\beta$  is not zero, there will be no change in equilibrium outcome as long as its  $\beta$  is small enough to neglect.

### 2.2.3. Meaning of delay benefit

Delay benefit is related to D's behavior within DSPm. If D temporarily blocks the normal process of DSPm,<sup>9</sup> or simply follows the DSPm process, D can prolong the discussion period and postpone settlement. Thus, delay benefit is related to time.

Delay benefit is composed of two parts: one is economic welfare and the other is the funding or contributions that politicians can expect from domestic interest groups. For example, if D delays the compliance of a panel's

<sup>8</sup> Of course, considering only economic aspects, we understand that a particular country might win from trade war under specific conditions. For example, Johnson (1953) found that gain (from a trade war) is likely when the price elasticity of demand for imports is higher in the home country than in the foreign country and if the foreign country's income elasticity of demand exceeds unity. Kennan and Riezman (1988) show that if one nation is substantially bigger, it can expect to gain from a tariff war. McMillan (1993) also identifies necessary conditions for a country to gain from a trade war. Our point, however, is that when we consider both economic welfare and political contributions, and when we recognize that the above mentioned conditions are very limited, no country may gain practical benefits from trade war. Thus, without loss of generality, we assume that  $\beta_1 - \beta_3$  and  $\beta_4 - \beta_2$  is zero.

<sup>9</sup> A temporary block will not be regarded as a permanent block, so that it may help D to get more delay benefit.

recommendations, it can extend protection of certain items or industries over time. Although there can be some loss of consumer's surplus from such extension, D can expect more contributions from relevant interest groups. Indeed, no nation would wish to abolish protective trade measures in question unless they are asked to do so by GATT, except already motivated to do so for by domestic reasons. Our point, therefore, is that D will delay the process as long as it expects delay benefit, and from D's perspective, delay benefit is usually advantageous.<sup>10</sup>

#### 2.2.4. $\gamma$ : Reputation loss

Since the concept of reputation loss is so abstract and ambiguous, there is no generally accepted definition and it is impossible to measure its amount. For this reason, the following explanation should be understood as a preliminary attempt to grasp that concept.

#### **The first foundation of reputation loss: Obligation**

As long as trade disputes are discussed in DSP, member countries have some obligation to keep its rules and procedures. Since DSP (and, generally, GATT) is created by member countries, it cannot be sustained without a minimum voluntary compliance with its rules and procedures. This minimum voluntary compliance is undertaken through some sense of national obligation.<sup>11</sup> To rephrase via the converse, the very existence of DSP (GATT) gives policymakers of member countries some obligatory inclination to comply with its rules, since their own countries agreed to set up DSP in the first place. Policymakers will pay special attention to whether or not their behavior (trade policy) is consistent with those rules, although they do not always comply with them. Sometimes the desire to breach rules might be greater than the obligatory feeling to comply with them.<sup>12</sup>

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<sup>10</sup> There might be delay loss from C's perspective. However, we will not consider it explicitly since C's delay loss, if any, contains the characteristic of opportunity cost.

<sup>11</sup> From this perspective, this concept of responsibility is similar to that of international obligation suggested by Kovenock and Thursby (1992). They say, "To the extent that governments try to settle disputes through GATT-DSP (rather than unilaterally retaliating or bilateral negotiation outside GATT), it is clear that they take this international obligation seriously."

<sup>12</sup> Jackson (1991, p. 83) clearly describes this delicate point as follows. "Despite cynical statements by members of the U.S. Congress that GATT rules are "irrelevant," there are a number of proven instances when congressional committees and their staff members have taken considerable trouble to tailor legislative proposals so as to minimize the risk of a complaint to GATT. Not all of these efforts have been successful, but in other cases Congress has been persuaded to drop a proposal because of its consistency with GATT provisions. The U.S. executive branch also is influenced in its action by GATT legality arguments, although it too does not always defer to these."

If the above logic is plausible, obligation, and consequently policymakers feelings of obligation, would flow from the very existence of GATT. We regard this obligatory feeling imposed on policymakers as the foundation of reputation loss: A nation incurs reputation loss when its policymakers do not keep the rules. Given high feelings of obligation, reputation loss from breaching the rules is high and vice versa.

For this reason, there is no difference in the level of reputation loss among countries. For instance, even if a small country and a large country both make violations in a particular year, they incur the same level of reputation loss. The size of a nation has no impact on the amount of reputation loss. However, the level of reputation loss is not fixed, but varies. Whenever there is a conclusion of multilateral trade negotiations within GATT, it is natural that member countries feel international obligation more strongly than ever. Policymakers, for instance, would feel obligations more in the year multilateral negotiations are successfully ended, than they do in other years. Thus, the level of reputation loss is strongest in a year when trade negotiations end successfully: The variable REP1 in the regression analysis is devised to capture this idea.

Based on the above explanation, reputation loss is generally assumed to be positive. Nations clearly understand that when they violate the rules, they incur positive reputation loss. From this reason, they usually do not like to violate them: the obligatory feeling functions well. It is a very general and normal situation.<sup>13</sup>

### **The second foundation of reputation loss: reduced trade**

Member countries might think that the violating nation is too uncooperative (since it violates the rules) to build the GATT ideal together, for instance, free and fair trade. Hence, the greater the number of violations, the more cautious they become to trade with it. If the other member countries are reluctant to trade with the violating nation, the violating nation might face reduced trade volume or reduced export in the future. Nations recognizing the possibility of losing export markets would have a natural tendency not to violate any rules and procedures of DSP, when trade (export) is an important component of their economies.

Thus, this possibility of reduced trade or export may be another foundation of reputation loss.<sup>14</sup> Unlike the first foundation of reputation loss, the second one is

<sup>13</sup> In exceptional cases, this obligatory feeling rarely does not work. If a strong desire to breach the rules, which mainly comes from domestic political pressure, overwhelms the national sense of obligation, a violation might occur. In this case, negative reputation loss occurs since the obligatory feeling is ignored. However, this possibility should be considered very cautiously since it happens very rarely. If it happened frequently, GATT and DSP could not survive.

<sup>14</sup> This concept can be explained as follows. 'Reputation' is a label attached to a nation so that it can guarantee assurances to a trading partner even if the trading partner has had no prior chance to evaluate that nation as a partner. If a nation incurs reputation loss, it may hurt its

clearly based on nation's economic characteristics such as trade or export. The variables of REXP and REXPC, discussed in the empirical section, are devised to capture this idea.

Therefore, it is assumed that whenever there is a violation of rules or procedures, the violator incurs a reputation loss of  $\gamma$ . It is further assumed that the value of  $\gamma$  occurring in different procedures of DSP is almost identical: it is generally positive but might be negative in exceptional situations.<sup>15</sup> Subscripts of are used to identify its origin.

### 2.3. The Models

#### 2.3.1. The Complete Information Model (Figure 2)

<Explanation of the model>

A trade dispute occurs between C and D. Since they do not settle the dispute through bilateral consultations under the GATT Article XXII, they enter the multilateral stage specified in the GATT Article XXIII and customary practices. C and D are assumed to be risk-neutral, and would like to maximize their expected utility. It is assumed that both nations are of almost equal size; however, this assumption will be loosened later. When entering DSPm, given an assumption of complete information, both parties know which party will be a winner, what the values of the parameters are, and what the procedures will be. Even though the likelihood of a complete information game is somewhat limited because of this assumption of completeness, the analysis shows that its explanatory power is still viable considering its simple structure.

D moves first, C follows and in sequence D reacts to C's action. D faces three kinds of decisions (To understand these options better, please see Figure 2). First, D must decide whether or not to block the establishment of the panel; second, whether or not to cross-retaliate; third, whether or not to block the adoption of a panel report. Thus D's feasible action at each game node would be twofold: either, "NB" or "B"; either "NR" or "R". "NB" means that D does not block (that is, agree on) setting up a panel or the adoption of a panel report, while "B" means to block (not to agree). "NR" means that D decides not to cross-retaliate, while "R" means the decision to cross-retaliate. Meanwhile, C faces only one kind of decision, whether or not to retaliate. Thus C's feasible action at each game node would be "NR" (not to retaliate) or "R" (to retaliate).

Payoffs are determined both by strategic behaviors and by the models'

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own future benefit: this provides incentive to avoid this reputation loss. Based on this, the existence of reputation loss can be justified by the logic of *horizontal issue-linkage*. Since DSPm is a part of GATT, the reputation of a certain country in DSPm would be common knowledge among all GATT members. In this situation, a country with reputation loss cannot expect a benevolent attitude from other countries both in DSP and in other activities in GATT.

<sup>15</sup> For more detailed explanation of exceptional situations, please refer to footnote 12.

parameters. As explained in the previous subsection, when C wins the dispute and D loses, C will eventually gain  $\alpha$  and D will lose  $\alpha$ . However, D will earn some delay benefits, depending on how the game ends. If there is (cross) retaliation, one retaliating party will gain  $\beta$  and the other party will lose  $\beta$ , because of their equal size.<sup>16</sup> All retaliation will be unauthorized, since GATT permits any country to block a request for authorized retaliation via the principle of consensus (unanimity).<sup>17</sup>

Whenever parties in dispute violate the procedures of DSPm (through blocking the panel set-up, blocking adoption of a panel report, retaliation, or cross-retaliation), they will incur reputation loss,  $\gamma$ . Subscripts of  $\gamma$  are used to identify the source of reputation loss but their values are assumed to be the same.

Each stage of the dispute is assigned an interest rate,  $r$ , to denote D's delay benefits. This benefit does not accrue to C because C's payoff is mainly determined by the panel decision. Thus, whenever D chooses to delay the process in DSPm, its total payoff would be  $\alpha(1+r)^n - \alpha$ , where  $n$  is the stage in which a dispute is settled.<sup>18</sup> All parameters are generally assumed to be positive but might be negative in an exceptional situation.

#### <Analysis>

To derive the game's equilibrium outcomes, we need one behavioral assumption as follows, "C will retaliate only if D does not show any intention of repaying  $\alpha$ . Thus, even though D blocks any process, C will not retaliate if D shows its intention to repay, via another negotiation not included in this model." This assumption is necessary for the strategy of (B, NR) and (NB, NR, B, NR) to be feasible in this model, since it guarantees a settlement in (B, NR) and (NB, NR, B, NR).<sup>19</sup>

To derive the game's equilibrium outcomes is straightforward given the

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<sup>16</sup> Please see section 2.2.2.

<sup>17</sup> The principle of consensus is one of the cornerstones of GATT. Initially, unanimity was not necessary, but it was required for decision making until 1959 so that any nation could prevent unanimity merely by opposing. Thus, this principle has permanently impeded GATT from authorizing retaliation.

<sup>18</sup> When a panel begins, the total benefit to D is  $\alpha(1+r)$ . Since consultations should precede going to DSPm, there will be a time lag between the stage of bilateral consultations and the beginning of DSPm.

<sup>19</sup> Our model covers only those cases where there is settlement. Without this assumption, the strategy of (B,NR) and (NB, NR, B, NR) would not be chosen as an equilibrium outcome (because in reality C would want to retaliate if there is no settlement) and will not be covered in this model. Would any country (as C) not retaliate if D blocked and showed no intention of repayment? Maybe not. For this reason, for (B,NR) and (NB, NR, B, NR) to be feasible in this model, there should be some repayment. In reality, we can find some cases where D finally compensates even though D blocks the establishment of a panel or the adoption of a panel report (See Hudec (1993)).

complete information assumption.<sup>20</sup> As Figure 2 clearly shows, the DSPm game with complete information is composed of two stages: One is the set-up of a panel and the other, the adoption of its report. Since their structure is almost the same,<sup>21</sup> we focus on the second stage, i.e., the adoption subgame: a game where D faces a decision whether or not to agree to the adoption of a panel report. For analyzing the adoption subgame, we have to consider two cases,  $\beta - \gamma_4 > 0$  and  $\beta - \gamma_4 < 0$ , since D's choice (NR or R) at the last move of the adoption subgame is determined by the difference between  $\beta$  and  $\gamma_4$ . First, under the condition of  $\beta - \gamma_4 > 0$ , the equilibrium outcome of this subgame will be (NB, NR). It is simple to trace the process leading to the equilibrium by backward induction. When D is confronted, at the last node of the adoption subgame, with a choice of no cross-retaliate (NR) or cross-retaliate (R), D will definitely choose R (a dominant strategy) because D compares  $\alpha(1+r)^6 - \beta - \gamma_3$  from NR and  $\alpha(1+r)^6 - \gamma_3 - \gamma_4$  from R, and the latter is greater than the former under the condition of  $\beta - \gamma_4 > 0$ . Next, when C is confronted with a decision of no-retaliate (NR) or retaliate (R), C will definitely choose NR, since  $\alpha > -\gamma_5$ . The reason is as follows: C clearly understands that if it retaliates (R), D will choose to cross-retaliate (R), since it is D's dominant strategy at the last node of the subgame. In this case, C have to compare  $\alpha$  from NR and  $-\gamma_5$  from C's retaliation (R) and D's following cross-retaliation (R). Of course,  $\alpha$  is greater than  $-\gamma_5$  since parameters assumed to be positive generally. Thus, C chooses no-retaliation (NR). Furthermore, when D is again confronted with a decision of no-block of the adoption of a panel report (NB) or block (B), D will choose NB by the following logic. Since D clearly understands that C's dominant strategy is NR, D compares  $\alpha(1+r)^5 - \alpha$  from D's NB and C's following NR and  $\alpha(1+r)^5 - \alpha - \gamma_2$  from D's B and C's following NR. Clearly the former is greater than the latter. Therefore, the equilibrium outcome of this subgame under the condition of  $\beta - \gamma_4 > 0$  will be (NB, NR). After incorporating this outcome to the whole game and making one more backward induction, we derive the entire equilibrium outcome, (NB, NR, NB, NR) under the condition of  $\beta - \gamma_4 > 0$ .

<sup>20</sup> In a complete information game, it is assumed that both parties know the panel decision before the game begins. If C knows it will win and D knows it will lose, D would still proceed in DSPm in spite of its weak type, since it can expect, at least, benefits derived from delaying (delay benefits). However, if C knows it will lose, C has no incentive to continue the DSPm process since C expects nothing. Thus, in a complete information game, this paper will not consider the cases where C loses and D wins.

<sup>21</sup> One difference is that the source of reputation loss is different. For example, in the stage of setting up a panel, reputation loss from blocking appears, while in the latter stage, reputation loss from blocking a panel report will appear. However, the amount or value of reputation loss is assumed to be the same.

This condition means that the total utility (benefit) resulting from (cross) retaliation ( $\beta$ ) is greater than the reputation loss from (cross) retaliation ( $\gamma_4$ ). In this situation, we can interpret the outcome as follows. First, if threat of cross-retaliation by D is credible of ( $\beta > \gamma_4$ ), C will not retaliate because it knows that D will cross-retaliate if it retaliates. Second, in making a decision, they behave in a way to avoid incurring reputation loss because it will reduce their payoffs (See the above explanation).<sup>22</sup>

The similar logic can be found under the condition of  $\beta - \gamma_4 < 0$ . Under even in this condition, the entire equilibrium outcome would be the same as before, (NB, NR, NB, NR).

In the cases where national sizes are different, it is assumed that a small nation would not have any retaliatory power, and accordingly, its  $\beta$  is regarded as negligible. The similar logic mentioned above would be used to derive equilibrium outcomes.

### 2.3.2. The Incomplete Information Model (Figure 3)

#### <Explanation of the model>

The incomplete information model, identical to the complete information model except for informational differences, provides a more elaborate explanation of nations' behaviors. In the incomplete information model, both parties do not know whether they will win (strong type) or lose (weak type) at the initial node of a game. To solve an incomplete information game, it must be converted into a game with complete but imperfect information. For this conversion, it is conventional that nature (the panel) reveals its information (which party wins) at the beginning of a game. However, it is assumed that the panel reveals the information about its decision at the beginning of the game only to C.<sup>23</sup>

This information asymmetry will not continue through to the end of the game. It will be resolved when the panel report is released, given the customary practice of panels in DSPm. According to GATT (1980), all information regarding a panel's decision, its basic rationale, and its recommendation, should

<sup>22</sup> In detail, reputation loss is important in D's choosing NB and C's choosing NR. Keep in mind that in equilibrium, D chooses two NBs and C, two NRs. In this instance,  $\gamma_1$  is important in D's first choice of NB while  $\gamma_2$  is important D's second choice of NB. In C's choosing two NRs,  $\gamma_5$  is important in both cases.

<sup>23</sup> The reason of not assuming 'nature reveals its information to D' is as follows: First, a game with private information of both parties is too complicated to analyze successfully without giving more explanation than in the case of one party. Second, since the customary practice of a panel is impartial to both parties, both assumptions, nature's revelation of information to either C or D, are acceptable. Third, the assumption of 'nature's revelation of information to D' makes the model more difficult without any significant contribution to the understanding of DSPm. Fourth, our assumption is more reasonable for analyzing DSPm since C's belief about its winning is critical to C's decision to enter DSPm.

be released to the contracting parties before the Council meeting to discuss the adoption of the panel report is held. Thus from the second move on, D will not face incomplete information: we call it "Removal of information asymmetry." Thanks to this characteristic, D's uncertainty about the information sets will appear only once, at the beginning of the game (See Figure 3).

#### <Analysis>

To find an equilibrium outcome, the concept of Bayesian Nash Equilibrium is used. However, we do not report equilibrium strategy but only report equilibrium outcome since only what actually happens is important in the analysis of DSPM.

We solve this game by the following conventional logic: We assume that C and D have some *ex-ante* (before nature moves) prior belief that the probability of C's winning is  $p$ . After nature's move, C knows its type correctly. Meanwhile, D holds its *ex-ante* prior belief. Even after nature's move, C knows that D's *ex-ante* belief is  $p$ , and D knows that C knows that D's *ex-ante* belief is  $p$ . D is asked to move first. Since D is not sure where it is located, that is, which node it is, or which party will win, it must choose its behavior to maximize its expected utility, which can be calculated by using the *ex-ante* belief,  $p$ , and generally known payoffs. Suppose that there is a probability  $p^*$  which makes D indifferent in choosing between NB and B. In other words, if the prior belief of D is  $p^*$  ( $p = p^*$ ), the expected utility from NB is equivalent to that from B. It is easy to find  $p^*$ . By the same logic, we can also easily find a particular probability through which D's expected payoff from choosing NB is greater than that of choosing B, and vice versa. To restate, under some prior belief, D chooses NB and under other prior belief, B.

However, before calculating a particular probability under which D chooses NB or B, we have to emphasize that after D's first move, all the choices of C and D are determined by concepts of backward induction and subgame perfection. For instance, suppose that D's first choice is not to block setting up a panel (NB). C clearly understands that D's choice maximizes the expected utility of D, given a particular prior belief which C and D both know. Since all information would be complete after this move, C knows where it is located and D also knows where it is located. By this reason, C's choice of NR or R, and D's following choice, are made by choosing a greater payoff from a binary choice: It clearly requires backward induction and subgame perfection, whose process is similar to that of complete information.

Figure 4<sup>24</sup> is the simplest extensive form of incomplete information game after conducting a couple of backward inductions by using "Removal of

<sup>24</sup> Figure 4 is prepared under the condition of  $\beta - \gamma_4 > 0$  which is required for conducting backward induction based on "Removal of information asymmetry." In other words, other conditions are also required for conducting backward induction. However, for explanatory purposes, we will confine only to the case of  $\beta - \gamma_4 > 0$ .

information asymmetry.” We can calculate, from this Figure 4, under what prior belief, “p,” D chooses NB or B. Suppose that the *ex-ante* prior belief of C’s winning is p and C’s losing is 1-p. Under this belief, D’s expected welfare when it choose NB and when it choose B would be “ $W1 = p(\alpha_1 - \alpha) + (1 - p)\alpha_1$ ” and “ $W2 = p(\alpha_2 - \alpha - \gamma_1) + (1 - p)(\alpha_2 - \gamma_1)$ ,” respectively, where  $\alpha_1$  means  $\alpha(1 + \gamma)^5$  and  $\alpha_2, \alpha(1 + \gamma)^3$ . The prior belief under which D chooses NB will be calculated by the inequality of  $W1 > W2$ , which is summarized by  $\alpha_1 - \alpha_2 > -\gamma_1$ . The important thing is that even though we wanted to calculate the prior belief, we find that it dropped out after the calculation. Since  $\alpha_1 - \alpha_2$  is interpreted as delay benefit, we can say that when delay benefit is normal, which implies that D expects greater welfare by choosing NB, D chooses NB as its first behavior. After D’s first choice, all the choices of C and D will be automatically followed by the assumption of “Removal of information asymmetry.” Then, the whole equilibrium outcome would be NB, NR, NB, NR.

Similar explanation can be applied to the remaining conditions.<sup>25</sup> And, in the cases where national sizes are different, it is assumed that a small nation would not have any retaliatory power, and accordingly, its  $\beta$  is regarded as negligible. The similar logic mentioned above would be used to derive equilibrium outcomes.

#### 2.4. Equilibrium Outcomes and Main Findings

Table 3 summarizes the equilibrium outcomes of two game models, and gives us some useful insights into understanding nations’ behavior within DSPm.

The first finding is that the most important variable in explaining nations’ *ex post* behaviors is their size and who the disputing partner is. As is shown in Table 3, various behaviors, for instance, the strategy of retaliation (R) and the behaviors of (NB, R), are feasible only in disputes between unequal-sized nations. Clearly, when there are disputes where a large nation is the complainant and a small nation is the defendant, the most varied behaviors are observed. This significance of national size is based on the possibility of cross-retaliation. A large nation has sufficient power and ability to take a retaliatory action and/or a cross-retaliatory action, while a small nation does not. However, this power is not always practicable as it is sometimes checked by the existence of reputation loss.

It should be emphasized that the possibility of blocking the set-up of a panel (B) is open to both small and large nations. This indicates that while national size does matter in explaining the whole set of behaviors in DSPm, it does not assist in explaining the behavior of blocking. This consideration will constitute

<sup>25</sup> Refer to footnote 23.

an important part of empirical tests.

The second finding is that in a normal situation,<sup>26</sup> where reputation loss (here,  $\gamma$ ) is positive and the delay benefit (here,  $\alpha_1 - \alpha_2$ ) is positive ( $\alpha_1 - \alpha_2 > -\gamma_1$ ), (NB, NR, NB, NR) would be the only available outcome between equal-sized nations regardless of whether they win or are defeated, and regardless of whether information is complete or incomplete. It is also easily found that in unequal-sized nations, (NB, NR, NB, NR) is the dominant behavior. Thus (NB, NR, NB, NR) is the most frequently observed outcome. This will become one of the hypotheses in the following empirical tests. Moreover, when information is complete, (NB, NR, NB, NR) would be the only feasible outcome regardless of both size and the panel's decision.<sup>27</sup> This means that if GATT provides disputing countries with sufficient information about a judicial decision before DSPm proceeds, and thus, disputing countries correctly anticipate the panel's decision, there will be no violation of the DSPm procedures.

The third finding shows that the absolute size of  $\alpha$  and  $\beta$  has no influence on the equilibrium outcome. This outcome arises in both the complete and incomplete information games.<sup>28</sup> Figure 5, which describes the adoption subgame of the DSPm game using two  $\alpha$ s and four  $\beta$ s, confirms this finding. As is shown in this figure, there is no change in the equilibrium outcome even though two  $\alpha$ s and four  $\beta$ s are used. In every case, the equilibrium outcome is (NB, NR), which is the same as in Table 3. The best way to confirm this is to trace the bold lines in Figure 5 with the logic of backward induction and subgame perfection.

This finding is important because it indicates that industry characteristics might not be important for nations in choosing their behaviors. The reason is relatively simple: Nations have to choose their behavior at each game node in a binary way, "to block or not to block" or "to retaliate or not to retaliate." In this situation, the value of total welfare, ( $\alpha$ ), which is derived from a panel decision and is related to industry characteristics, is initially given to both sides of the binary choice. Whenever C or D choose a behavior, they find that  $\alpha$ , which varies according to the industry, is simultaneously assigned to payoffs of both sides, so that  $\alpha$  is canceled out when comparing both payoffs. Because of this structure, the absolute size of  $\alpha$  is not an important factor; rather, other factors such as reputation loss, and the possibility of retaliation influence their behavior.

The most important variable supporting the functioning of DSPm over the last four decades, according to the models, is reputation loss,  $\gamma$ . In the panel set-up

<sup>26</sup> More than half of the disputes in GATT occurred in a normal situation.

<sup>27</sup> One must keep in mind that this result happens only when the reputation loss is greater than the net benefit of retaliation. Please see the explanation of asterisk conditions suggested in Table 3.

<sup>28</sup> For further explanation, please refer to the explanations in 'irrelevance of the magnitude of  $\alpha$ ' and 'irrelevance of the magnitude of  $\beta$ ' in subsections of 2.2.1 and 2.2.2 and footnote 7.

subgame, the reputation loss from blocking the set-up of a panel,  $\gamma_1$ , is very important and in the adoption subgame the reputation loss from unauthorized (cross) retaliation,  $\gamma_5(\gamma_4)$ , is also important. How and in what sense is this important? First of all, the existence of this reputation loss is important in that nations choose their behaviors to avoid this reputation loss. Furthermore, the magnitude or amount of reputation loss is also important in the sense that whenever  $\gamma$  is very low or negative, nations have a tendency to block or retaliate. A good example is a situation with an asterisk in Table 3 ( $\gamma_5 > \beta - \alpha$ ). According to this situation, the possibility of retaliation clearly depends on the magnitude of  $\gamma_5$ . If  $\gamma_5$  is sufficiently large, there is little possibility of retaliation.

### 3. EMPIRICAL EVIDENCE

#### 3.1. Hypotheses

The empirical tests are mainly based on the hypotheses derived from the previous section. Simple statistics and a regression analysis will be employed to confirm the hypotheses summarized as below. The main data source is Hudec's (1993) work,<sup>29</sup> especially the appendix, which summarizes all 207 relevant disputes in DSP from 1948 through 1989. In this paper, only disputes that have occurred since 1969, or 148 cases, are included in the empirical analysis due to limitations of the data.<sup>30</sup>

**Hypothesis 1 (General observation):** In most disputes, the behavior (NB, NR, NB, NR) is most frequently observed regardless of national size and the panel's decision.

**Hypothesis 2 (National size):** The size of a nation is important in explaining the *ex post* behaviors of nations under DSPm. However, it is not important in explaining the behavior of blocking (B).

**Hypothesis 3 (Industry characteristics):** Industry characteristics such as labor intensity, or local concentration have no influence on nations' behaviors within DSPm.

<sup>29</sup> According to Hudec (1993), it is difficult to identify whether pre-1960 disputes were handled as legal GATT complaints, or merely as complaints in the plenary meeting. He states, "the 53 complaints identified before 1960 include many episodes that would not be included in compendia using modern GATT forms as their benchmarks." Moreover, there were no disputes within DSP in the years from 1964 through 1968.

<sup>30</sup> Although this paper covers 148 cases, the Table 4 includes only 125 cases, since 23 cases were either withdrawn for unknown reasons or not reported to GATT after they were transferred to GATT Article XXIII. For more detailed explanation, refer to Hudec (1993), especially appendix.

**Hypothesis 4 (Reputation loss):** Nations choose behaviors that prevent them from incurring reputation loss. That is to say, the greater the reputation loss derived from breaking the rules of DSPm, the less probability nations will break them.

### 3.2. Statistical Analysis

The first hypothesis postulates that (NB, NR, NB, NR) is the most frequently observed behavior in DSPm, indicating that D will not block any process of DSPm (outcomes NB and NB) and C will not retaliate (outcomes NR and NR). One thing to note is that although (NB, NR) does not appear in the DSPm equilibrium outcome, it is nearly equivalent to (NB, NR, NB, NR). In the DSPm model, if C chooses NR after D's choice of NB, the second (NB, NR) in the adoption subgame follows automatically. In other words, the game structure forces nations to choose (NB, NR) twice when (NB, NR) is their initial behavior.<sup>31</sup> Table 4 shows that (NB, NR, NB, NR) constitutes 52.9 percent of all cases. Adding (NB, NR) increases the share to 82.7 percent.

The first part of the second hypothesis proposes that the size of a nation is very important in explaining the *ex post* behaviors of nations under DSPm. Table 5, especially columns A, E and G, confirms this. This table shows that the behaviors found in column A, the behaviors of equal-sized nations, are different from those in columns E and G, the behaviors of unequal-sized nations. For example, (B, NR) is not an observed outcome in disputes between nations of unequal size (columns E and G). Moreover, column G shows that when developing countries are the complainants, they do not retaliate regardless of winning or losing the dispute. And, column E shows that when developing countries are the defendant, they do not block any procedures of DSPm. In sum, the interests of developing countries can be protected simply by adhering to the procedures of DSPm. The very existence of GATT and DSP can help them to protect their benefits, or at least to minimize their losses.

### 3.3. Regression Analysis through the probit technique

#### 3.3.1. Variables

This subsection provides evidence that supports the second part of the second hypothesis, the third and the fourth hypotheses. The dependent variable for the regression analysis is whether or not there is a block within DSPm.

In the previous subsection it was shown that size is very important for

<sup>31</sup> However, if D's interest rate is not sufficiently high, C and D can end their game after their first moves (NB, NR). Remember that if the game ends by (NB, NR), the payoffs of C and D will be  $\alpha$  and  $\alpha(1+r)^3 - \alpha$ , respectively. If the game ends by (NB, NR, NB, NR), the payoffs will be  $\alpha$  and  $\alpha(1+r)^5 - \alpha$ , respectively. Thus, if interest rate is negligible, the payoffs from (NB, NR) and (NB, NR, NB, NR) will be the same.

explaining the *ex post* behavior of nations. Thus, it is natural to expect that the possibility of blocking is higher when a large nation is a defending country. However, this expectation may not be able to explain blocking behavior. According to Table 3, blocking could occur both in equal-sized and unequal-sized nations. Furthermore, large nations do not show consistent preference for blocking. Although a large nation blocks the dispute settlement process, it does so rarely, and in most disputes, it does not. For this reason, the size of a nation is expected to be statistically insignificant, and its direction to be negative. The variable USEC will be used in analyzing the significance of the size of a nation.

Industry characteristics, it has been discussed, may not be important for explaining nations behaviors within DSPm. The variables that represent industry characteristics are expected to be insignificant. Two variables, AGR and ITEM, will be used for this analysis.

The variable of reputation loss is expected to be very significant and its direction, negative. This implies that the greater the reputation loss, the less the possibility blocking will be undertaken. Since reputation loss cannot be observed objectively, two proxies, REP1 and REP2, are applied in the test. REP1 is based on the first foundation of reputation loss (Please refer to section 2.2.4). In short, REP1 is derived to embody the idea of policymakers' sense of obligation. The highest number representing reputation loss, 7, is assigned to the year when each multilateral trade negotiation (MTN) ends. One point is then incrementally deducted from that base year. The basic implication of REP2 is similar to REP1, but REP2 is a dummy variable simply representing the year when MTN was in progress. Variables for the probit analysis will be as follows:

### **Dependent Variable**

**BLOCK:** Assign 1 to a dispute where there is a block of any procedure of DSPm  
Assign 0 to a dispute where there is no block

### **Independent Variables**

**USEC:** Assign 1 to a dispute where the defendant is the US or the EC  
Assign 0 to a dispute where the defendant is neither the US nor the EC

**AGR:** Assign 1 to a dispute where an item in dispute is an agricultural product  
Assign 0 to a dispute where an item in dispute is not an agricultural product

**ITEM:** Assign 1 to a dispute where a particular item or industry is involved  
Assign 0 to a dispute where a particular item or industry is not involved

**REP1:** Policymakers sense of obligation (Refer to subsection 2.2.4)

**REP2:** Assign 1 to a dispute where it is filed in a year MTN has been in progress  
Assign 0 to a dispute where it is filed in a year MTN has not been in

progress

### 3.3.2. Regression Results

The regression results are summarized in Table 6. As expected, the variable USEC turns out to be statistically insignificant, although the last two columns (E and F) show limited significance. This fact indicates that the US and the EC do not always, in fact rarely, block the process of DSPm.

The variables AGR and ITEM are statistically insignificant, which confirms our expectations. It can be concluded that industry characteristics are not important for explaining nations' blocking behavior within DSPm.

The variable REP1 turns out to be very significant. Even though this result confirms our expectations, some reservations in accepting the fourth hypothesis (the greater the reputation loss, the less the possibility of blocking) remain. REP1 is not a generally accepted proxy for reputation loss. Nonetheless, the significance of REP1 strongly suggests that our method of deriving REP1 is worth more elaborate consideration. Meanwhile, REP2 turns out to be insignificant.

### 3.3.3. More Evidence Regarding Reputation Loss

This subsection provides regression results regarding the second foundation of reputation loss (Please refer to section 2.2.4). When a particular nation violates any rule, it might encounter trade difficulties with other nations and then experience reduced trade volume in the future.

For empirical purposes, two kinds of variables will be used for the regression analysis. One is REXP, the ratio of export to GDP in a defending nation, and the other is REXPC, the ratio of "a defending nation's export to a complaining country" to "total export in a defending nation." The first variable is devised to capture the total economic effects from all GATT member countries, while the second one is devised to capture those only from the complaining country. Consequently, the hypotheses regarding reputation loss will be as follows: 1) the greater REXP, the less the possibility of rules violation (blocking); 2) the greater REXPC, the less the possibility of rules violation (blocking). In this empirical test, the dependent variable would be, as usual, a binary choice to block or not to block.

The results are summarized in Table 7. First, like Table 6, the variables of AGR and ITEM are not significant. Second, the variable of USEC is not significant, either. Third, REXP turns out to be of limited significance while REXPC turns out to be nearly insignificant. This indicates that REXP is a better variable than REXPC in explaining blocking behavior. But, the positive coefficient of REXP is contrary to the expectation. This indicates that REXP might not be a good proxy of reputation loss or might represent more than reputation loss.

The positive relationship between REXP and BLOCKING may be explained as

follows. A small country may block some procedures of DSPm if it confronts severe domestic political pressure to ignore the discussion or decision in a panel. Hence, although reputation loss is great, a nation would like to ignore it if domestic pressure is greater than reputation loss. Domestic pressure, related to trade problems, usually occurs more frequently in the country whose REXP, or the ratio of export to GDP, is higher. Therefore, if the effect of domestic pressure is stronger than that of reputation loss, a positive relationship between REXP and BLOCK might exist.

Table 8 is devised to confirm this. The dependent variable in this table includes the case of a temporary block, which means that a defending country ultimately accepted setting up a panel or adopting a panel report after it temporarily blocked this procedure. The point is that if domestic pressure is really strong, the defending nation will want to try to block the process of DSPm. Thus, not only a positive sign but also an increased significance level may be expected. The significance level of REXP is greatly increased to 5 percent in Table 8 from the 20 percent in Table 7, and its coefficient is positive. All these results imply that the variable REXP might not be regarded as a proxy of reputation loss, but regarded as a proxy of both reputation loss and domestic pressure.

#### 4. CONCLUDING REMARKS

The main findings of this paper are summarized as follows. First, the size of a nation turned out to be an important factor. The rationale of its importance comes from the possibility of retaliation. In the models, a large nation is allowed to retaliate, but a small nation is not. This feasibility of retaliation seems to be, thus, the main source of the importance for national size. But retaliation is not always possible because it is controlled by other variables, especially reputation loss. Retaliation is then feasible only when its benefit is greater than the reputation loss accompanying it. From this perspective, the real source of the importance of national size is the relative magnitude of reputation loss.

Second, reputation loss, especially the reputation loss accompanying unauthorized retaliation, turned out to be very important in DSPm. Empirical evidence for reputation loss is provided through the probit technique. This evidence was not satisfactory because of the lack of a clear definition of reputation loss. However, the proxy variables, REP1 and REXP, proved to be statistically significant, though REXP represents both reputation loss and domestic political pressure. Some special attention, therefore, to elaborate these variables is desirable to enhance this research.

Third, industry characteristics turned out to be unimportant in DSPm. Its unimportance is based on the irrelevance of the magnitude of  $\alpha$  and the irrelevance of the magnitude of  $\beta$ , which demonstrates that the absolute values

of  $\alpha$  and  $\beta$  are not important for nations in deciding their behaviors in DSPm. Relatively good evidence is provided on this point.

Therefore, it is our conclusion that first of all, GATT is important in that it provides member countries with the feeling of international obligation represented by reputation loss whenever member countries violate the DSPm process. Meanwhile, GATT may not be important in that it depends upon reputation loss from *unauthorized* retaliation, which is clearly outside the realm of GATT.

**[Table 1] The Four Payoffs of the DSPm Model ( $\alpha$ )**

Decision	C's payoff	D's payoff
C wins (D loses)	$\alpha_1$	$\alpha_2$
C loses (D wins)	$\alpha_3$	$\alpha_4$

**[Table 2] The Six Payoffs of the DSPm Model ( $\beta$ )**

Retaliation	C's payoff	D's payoff
C retaliates	$\beta_1$	$\beta_2$
D retaliates	$\beta_3$	$\beta_4$
C retaliates and D cross-retaliates (Trade War)	$\beta_1 - \beta_3$	$\beta_4 - \beta_2$

**[Table 3] Summary of Equilibrium Outcomes**

	Equal-Sized Nations	Unequal-Sized Nations	Nations
Complete Information Model	NB, NR, NB, NR	D (small) C (large) NB, NR, NB, NR	D (large) C (small) NB, NR, NB, NR
Incomplete Information Model	NB, NR, NB, NR ( $\alpha_1 - \alpha_2 > -\gamma_1$ ) B, NR ( $\alpha_1 - \alpha_2 \leq -\gamma_1$ )	NB, NR, NB, NR (C wins or $\alpha_1 - \alpha_2 > -\gamma_1$ ) B, NR ( $\alpha_1 - \alpha_2 \leq -\gamma_1$ ) NB, R (C loses) [B, R]*	NB, NR, NB, NR (C wins) B, NR (C loses)

\* Only when the condition of  $\gamma_5 < \beta - \alpha$  is met, the behaviors marked by an asterisk will appear. In other words, when the reputation loss from unauthorized retaliation ( $\gamma_5$ ) is less than the gain from retaliation ( $\beta - \alpha$ ), the response block ( $\beta$ ) and/or retaliation ( $R$ ) might occur.

Note 1:  $\alpha_1$  and  $\alpha_2$  means  $\alpha(1 + \gamma)^5$  and  $\alpha(1 + \gamma)^3$ , respectively.  $\gamma_1$  means the Reputation loss occurred when D blocks the set-up of a panel.

Note 2: (NB, NR, NB, NR) : A dispute is settled without violating any rules and procedures of DSPm.

(B, NR): The set-up of a panel is refused by D (B), and the dispute is resolved without retaliation from C (NR).

(NB, R): The set-up of a panel is approved by D (NB) and the dispute is resolved with retaliation from C (R).

(B, R): A dispute is resolved despite the blockage of the panel set-up from D (B), and retaliation from C (R).

**Table 4: Nations Behaviors in DSP (1969-1989)**

Process	Strategy	Cases
The Bilateral Stage	(Total)	(44)
Settled through Bilateral Consultations		21
Uncertain cases		23
The DSPm model	(Total)	(81)
Cases where C wins	(Total)	(71)
	B, NR	4
	NB, NR	21
	NB, R(R)	1
	NB, NR, NB, NR	38
	NB, NR, NB, R	1
	NB, NR, B, NR	5
	NB, NR, B, R(R)	1
Cases where C loses	(Total)	(10)
	NB, NR	1
	NB, NR, NB, NR	7
	NB, NR, B, NR	1
	NB, NR, B, R (R)	1

Note 1: D moves first. (R) means cross-retaliation.

Note 2: (B, NR): A dispute is resolved without retaliation from C (NR) although the set-up of a panel is refused by D (B).

(NB, NR, NB, NR): A dispute is settled without violating any rules and procedures of DSPm.

(NB, R(R)): A dispute is resolved with retaliation from C (R) and cross-retaliation from D although the set-up of a panel is approved by D(NB).

(NB, NR, NB, R): A dispute is resolved with retaliation from C (R) although there is no blocking from D.

(NB, NR, B, NR): A dispute is resolved without any retaliation although D blocks to accept a panel report.

(NB, NR, B, R(R)): A dispute is settled with retaliation from C (R) and cross-retaliation from D ((R))after D blocks to accept a panel report.

**[Table 5] The Breakdown of Behaviors by Country Groups<sup>32</sup>**

Complainant	OECD	US,EC	US	EC	OECD	US,EC	Dev**
Defendant	OECD	US,EC	EC	US	Dev.**	Dev**	OECD
	: A	: B	: C	: D	: E	: F	: G
B, NR	4	3	2	1	0	0	0
NB, NR	14, 1*	3,1*	2,1*	1	3	3	4
NB, R, (R)	1	1	1	0	0	0	0
NB, NR, NB, NR	31,6*	11,2*	5	6,2*	4	2	6,1*
NB, NR, NB, R	1	1	1	0	0	0	0
NB, NR, B, NR	4	4	4	0	0	0	1,1*
NB, NR, B, R(R)	1,1*	1,1*	1,1*	0	0	0	0
Total	56,8*	24,4*	16,2*	8,2*	7,0*	5,0*	11,2*

Note 1: \*means the cases where C lost. \*\* means developing countries. Mexico is included as a developing country. (R) means cross-retaliation.

Note 2: Behaviors are explained in Note 2 of Table 4.

**[Table 6] Regression results of the probit model (1969-1989)**

Dependent Variable: BLOCK

	A	B	C	D	E	F
CONST	-0.19 (-0.42:68)	-0.09 (-0.12:90)	-0.10 (-0.14:89)			
USEC	-0.22 (-0.52:60)	-0.30 (-0.75:46)	-0.29 (0.71:48)	-0.26 (-0.65:52)	-0.73** (-2.25)	-0.61* (-1.67)
AGR	-0.4 (-0.88:38)			-0.42 (-0.9:35)	-0.66 (-1.57:12)	
ITEM		-0.16 (-0.25:80)	-0.21 (-0.33:74)			-0.73* (-1.98)
REP1	-0.22* (-1.68)	-0.24** (-1.80)	-0.25** (-1.81)	-0.27** (-3.25)		
REP2			0.13 (0.29:73)		-0.62* (2.24)	-0.21 (-0.54:51)
Log	-24.28	-38.23	-24.62	-24.37	-28.61	-27.92
Likelihood						
No. of Obs	71	71	71	71	71	71

\*: significant at 10 % \*\*: significant at 5 % \*\*\*: significant at 1 %

The first term in parentheses is the t-value and the second term is the probability of accepting the hypothesis that the relevant coefficient is zero.

<sup>32</sup> The total number of DSP cases in Table 4 is 81, while that in Table 5 is 84 (the sum of A, E and G). The difference results from the fact that while the former is arranged by the criteria of behavior, the latter is arranged by the criteria of countries. For example, a particular case that is counted as one in the Table 4 could be counted as two or three in Table 5.

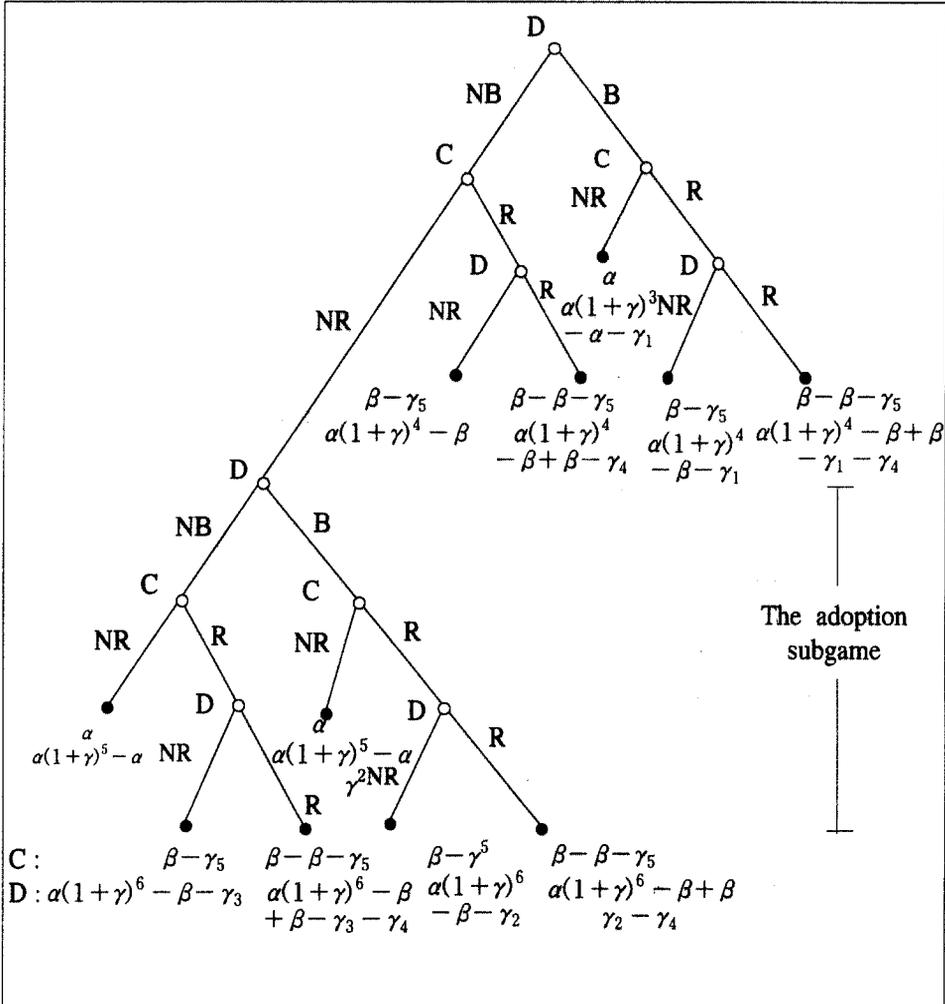
[Table 7] Regression Results of the Probit Model(1969-1989)  
 Dependent Variable: BLOCK

	A	B	C	D	E	F
CONST	-1.34*** (-2.88)	-0.76** (-2.03)	-1.25** (-2.34)	-1.25* (-1.74:9)	-0.75 (-1.19:24)	-0.78^ (-0.78:17)
USEC	-0.14 (-0.31:76)	-0.33 (-0.77:44)	-0.18 (-0.41:69)	-0.32 (-0.74:46)		
AGR	-0.51 (-1.14:26)	-0.47 (-1.1:28)	-0.51 (-1.16:25)			
ITEM				-0.14 (-0.22:82)		
REP1					-0.24* (-1.8)	-0.23* (-1.78)
REP2					0.08 (0.18:85)	
REXP	0.02^ (1.34:18)		0.024^ (1.34:19)	0.02^ (1.31:20)		0.02^ (1.30:20)
REXPC		-0.003 (-0.3:73)	-0.003 (-0.03:74)	-0.002 (-0.29:77)	-0.002 (-0.27:79)	
Log	-24.92	-25.78	-24.87	-25.55	-24.09	-24.13
Likelihood						
No. of Obs.	71	71	71	71	71	71

^: significant at 20 %\*: significant at 10 % \*\*: significant at 5 % \*\*\*: significant at 1 %.  
 The first term in parentheses is the t-value and the second term is the probability to accept the hypothesis that the relevant coefficient is zero.



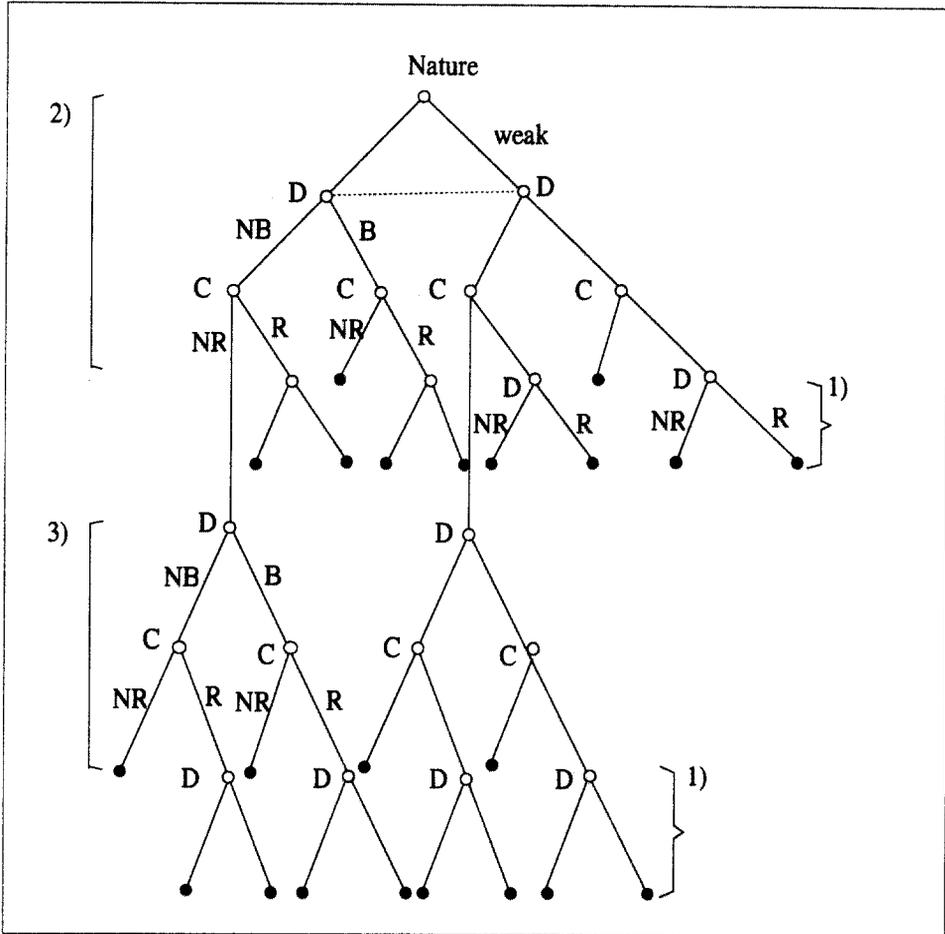
[Figure 2] The DSPm game with complete information between equal-sized nations



Note: NB(Not to Block) B(Block)  
 NR(Not to retaliate) R(Retaliante)  
 ● game ends ○ game continues

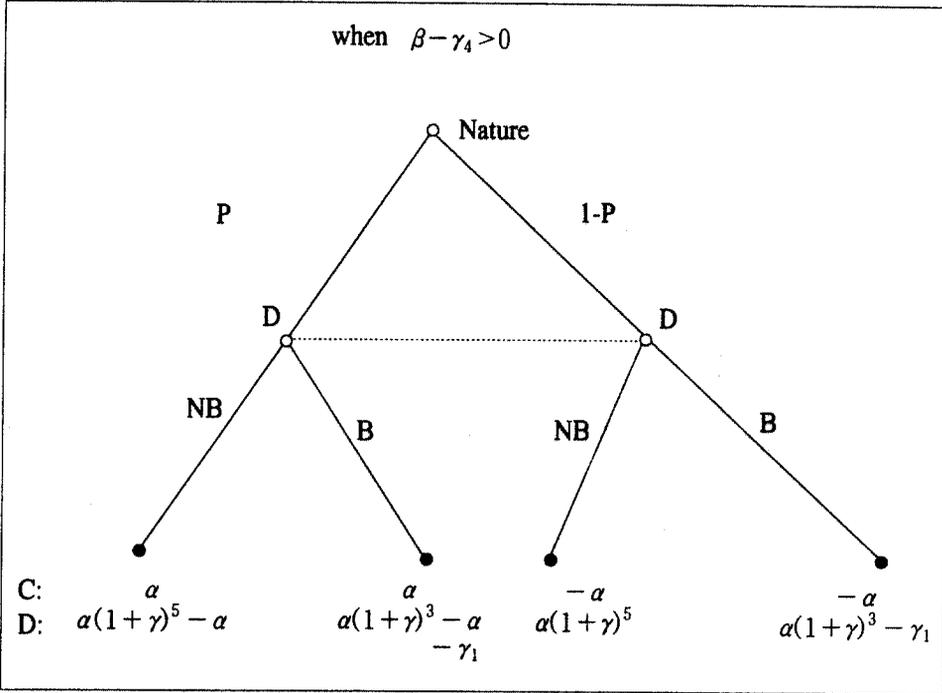
C :  $\beta - \gamma_5$   $\beta - \beta - \gamma_5$   $\beta - \gamma^5$   $\beta - \beta - \gamma_5$   
 D :  $\alpha(1 + \gamma)^6 - \beta - \gamma_3$   $\alpha(1 + \gamma)^6 - \beta + \beta - \gamma_3 - \gamma_4$   $\alpha(1 + \gamma)^6 - \beta - \gamma_2$   $\alpha(1 + \gamma)^6 - \beta + \beta - \gamma_2 - \gamma_4$

[Figure 3] The DSPm game with incomplete information between equal-sized nations



- Note: 1) Cross-retaliation  
 2) Panel game 3) Adoption subgame  
 NB: not to block B: to block  
 NR: not to retaliate R: to retaliate  
 ● Game ends.  
 ○ Game continues.

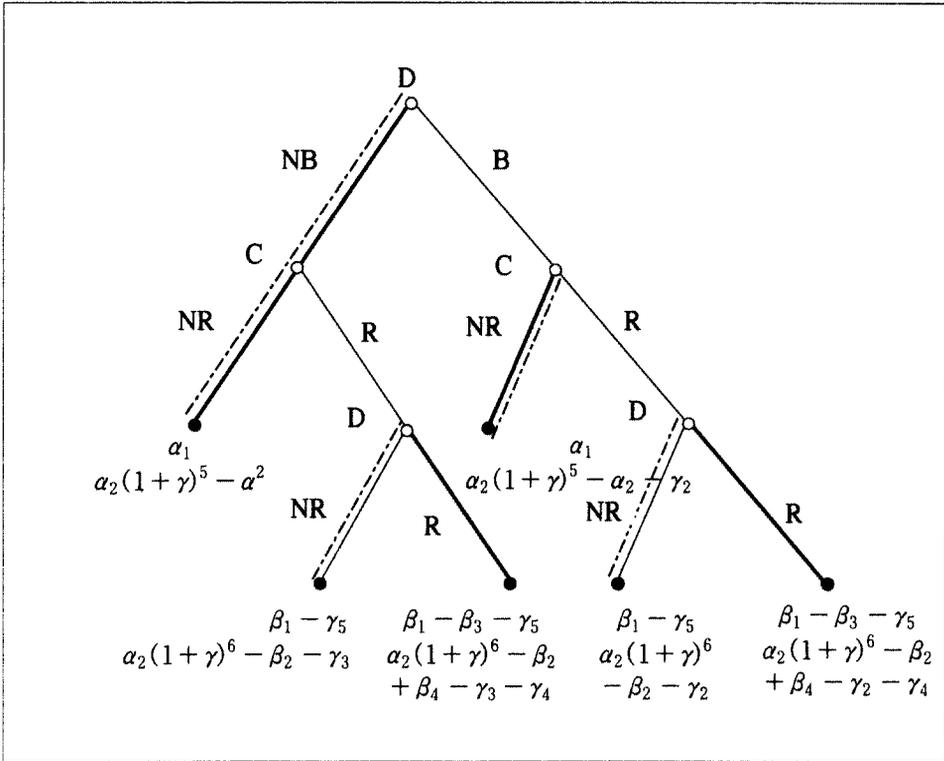
[Figure 4] The DSPm game with incomplete information between equal-sized nations: when  $\beta - \gamma_4 > 0$



$$\left[ \begin{array}{l} a_1 \equiv a(1+\gamma)^5 \quad a_2 \equiv a(1+\gamma)^3 \\ p: \text{prior belief of C's swimming} \end{array} \right.$$

- D's expected(welfare when it chooses NB ( $W_1$ ) :  
 $p(a_1 - a) + (1-p)a_1$
- D's expected(welfare when it chooses B ( $W_2$ ) :  
 $p(a_2 - a - \gamma_1) + (1-p)(a_2 - a_1)$
- Under what prior belief does D choose NB?  $W_1 > W_2$   
 $\Rightarrow pa_1 - pa + a_1 - pa_1 > pa_2 - pa - p\gamma_1 + a_2 - \gamma_1 - pa_2 + p\gamma_1$   
 $\Rightarrow a_1 - a_2 > -\gamma_1$

[Figure 5] The adoption subgame of the DSPm game with two  $\alpha$ s and four  $\beta$ s



Note: 1) i)  $\beta_4 - \gamma_4 > 0$  ( $\beta_4 > \alpha_4$ ) : **—————**  
 ii)  $\beta_4 - \gamma_4 < 0$ , and  $\alpha_1 > \beta_1 - \gamma_5$ : **.....**  
 2) Bold lines and dotted lines mean dominant strategies.

## REFERENCES

- Bebchuk, Lucian Arye (1984), "Litigation and Settlement under Imperfect Information," *Rand Journal of Economics*, vol. 15, no. 3, pp.404-415.
- Cooter, Robert D. and Daniel Rubinfeld (1989), "Economic Analysis of Legal Disputes and Their Resolution," *Journal of Economic Literature*, vol. 27, no. 3, pp.1067-97.
- Grossman, Gene M. and Elihanan Helpman (1994), "Protection for Sale," *American Economic Review*, vol. 84, no. 4, pp.833-850.
- Gould, John (1973), "The Economics of Legal Conflicts," *Journal of Legal Studies*, vol. 2, no. 2, pp.279-300.
- Hudec, Robert E. (1993), *Enforcing International Trade Law*, Salem, New Hampshire: Butterworth Legal Publishers.
- Jackson, John H. (1991), *The World Trading System*, (The MIT Press: Cambridge, Massachusetts).
- Johnson, H. G. (1953), "Optimum Tariffs and Retaliation," *Review of Economic Studies*, vol. 21, pp.142-53.
- Kennan, J. and Raymond Riezman (1988), "Do Big Countries Win Tariff Wars?," *International Economic Review*, vol. 29, no. 1, pp.81-85.
- Kovenock, Dan and Marie Thursby (1992), "GATT, Dispute Settlement and Cooperation," *Economics and Politics*, vol. 4, no. 2, pp.151-176.
- Ludema, Rodney D. (1990), *International Trade Agreements and GATT Rules: A Game - Theoretic Approach*, Ph.D. dissertation, Columbia University.
- Magee, Stephen P., William A. Brock and Leslie Young (1989), *Black Hole Tariffs and Endogenous Policy Theory: Political Economy in General Equilibrium*, (Cambridge Univ. Press, Cambridge).
- McMillan, John (1993), "Trade Accords and Trade Wars," *Trade, Welfare and Economic Policies: Essays in Honor of Murray C. Kemp*, edited by Horst Herberg and Ngo Van Long, University of Michigan Press: Ann Arbor.
- Pescatore, Pierre (1993), "The GATT Dispute Settlement Mechanism," *Journal of World Trade*, vol. 27, no. 1, pp.5-20.
- Rodrik, Dani (1995), "Political Economy of Trade Policy," in Gene M. Grossman and Kenneth Rogoff, eds., *Handbook of International Economics* volume III (North Holland, Elsevier), pp.1457-1551.
- Schweizer, Urs (1989), "Litigation and Settlement under Two-sided Incomplete Information," *Review of Economic Studies*, vol. 56, no. 2, pp.163-177.
- Staiger, Robert W. (1994), "International Rules and Institutions for Trade Policy," *NBER*, Working Paper, no. 4962.