A Market Model of WTO-DSU for Freemasonry Amongst Developed and Developing Countries[1]

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November 4, 2009

[1]I am truly grateful to Professors Winston Chang, Isaac Ehrlich, Seiichi Katayama, Wolfgang Mayer, Laixun Zhao, and all particippants of my seminar at Kobe University for many helpful comments, supports, and encouragements. In advance, I am also thankful to all participants of my forthcoming seminer at Hitotsubashi University. All remaining errors and shortcomings are mine.

Abstract

WTO faces lots of difficulties especially after the second millennium by misunderstandings amongst developed and developing countries. Applying some techniques of the market model of crime, this paper reconsiders what are the affirmative gains from WTO-affiliation especially for developing countries that typically possess smaller bargaining power. In the analysis, the dispute settlement mechanism is considered as the comparative advantage of WTO. Then we find proper operations of the dispute settlement process improve the bargaining power of small countries. In addition, we also find some controversial issues such as Safeguards, Anti-dumping, GATS and TRIPs "can be" justified by the reciprocity rule.

JEL Classifications: F13; K33

Keywords: World Trade Organization; dispute settlement rule; bargaining power; reciprocity; market model of international trade dispute

1 Introduction

Starting from twenty-three countries, affiliation with the General Agreement on Tariffs and Trade (GATT) was continued expanding until the World Trade Organization (WTO) had launched in January 1995. And starting from seventy-seven countries, WTO also continued expanding to reach over one-hundred and fifty members. What is the engine of expansion of this institution? Of course, there are gains from trade as traditional theories have suggested in many contexts. However, the nominal rates of tariffs on manufacturing goods are almost zero especially in developed countries. Now, if countries seek gains from trade, then, they need to talk about trade liberalizations in agricultural goods and non-tariff barriers (NTBs). But these issues are extremely difficult because agriculture is highly related to national security issues and NTBs are usually national sovereign issues. In addition, a recent series of studies by Rose [61, 62] has posed a question about the role of GATT/WTO if it promotes international trade and he has concluded not positively and not necessarily WTO.

If an organization does not provide sufficient benefits for members, it will be resolved (e.g. Olson [55]). On one hand, we believe the GATT/WTO framework has provided sufficient benefits from encouraging rule-based trade liberalizations, however, on the other hand, we may concern there is merely no alternative to replace.

In the very early era of the GATT, only the United States was the developed economy, and the rest of the world was either underdeveloped or ravaged by the Second World War including Western Europe and Japan (affiliation since 1956). Under such circumstances, the United States took its leadership to open up its domestic markets for GATT members. Then, many countries raced to the American markets to sell domestic products and that undebatably was at least one of the engines of expansion of GATT. For the United States, one of her incentives was definitely to block and to dominate Communism when the Soviet and her allies had formed so-called COMECON (COMmunist ECONomic community). Therefore, the gains from extending GATT affiliations were apparent for all Western countries in 1950's.

The most major steps in the earlier GATT history toward free trade were taken by two major rounds: The Kennedy Round (1964-67) and the Tokyo Round (1973-79). These two rounds were incomparable with previous ones insomuch as numbers of participants and tariff-reduction progenies—sixty-two countries in the Kennedy Round and one-hundred and two countries in the Tokyo Round. During these periods of two rounds, GATT members had increased greatly and Western Europe and Japan recovered from the damages of the War. New members were developing countries. In these periods, GATT affiliation provided tickets for the developing countries to markets of the developed countries members, and products of developing countries were not conflicting with products of developed countries. In addition, the world was in the Cold War.

The change had occurred during the Uruguay Round (1986-95). Affiliations had also reached one-hundred and twenty-three countries within this long period. At this point, Western Europe and Japan had already achieved highly advanced level of development. The difference between the former rounds was the involvements of larger numbers of "new" developing countries. In addition, conflicts between products of developed countries and developing countries had started to appear as represented by the rise of then Newly Industrialized Economies (NIEs).

The major focus of the Uruguay Round was on agricultural trade and, of course, establish-

ing the World Trade Organization. However, there were some other major issues including the Understanding on Rules and Procedures Governing the Settlement of Disputes and the Agreement on Safeguards based on Codes ratified in the Tokyo Round—the Anti-dumping Measures were discussed in the Kennedy Rounds but we still have no successful agreement. Although GATT 1948 had already included these mechanisms (GATT Articles XIX, XXII and XXIII), these agreements are important because they codify "official" processes of dispute settlement procedures and safeguards as a common understanding. What is the benefits for the developed countries, and what are the benefits for the developing countries from these agreements?

The role of GATT/WTO has been changing power-oriented relations into rule-based negotiations (e.g. Jackson [40]) and it is directly linked to benefits for members. Intrinsically, however, large countries likely benefit from power-based relations. Actually, improvements in the dispute settlement rules and practices were desired by the developing countries and small countries. During the Cold War era, it is understood that large western countries relinquish some power-based approaches for developing allies in order to dominate eastern countries. But the Cold War was over.

As it has already been mentioned, if an institution has lost its abilities to provide members with benefits, members will leave the society. As time passes, as briefly review above, situations have hauled forcing our world trading system to be modified (e.g. Bhagwati [12]). At present, tariffs are low except for agricultural goods and existence of NTBs. And there is no aggressive ideological war. In addition, we have lots of conflicts amongst the developed and the developing countries over trade issues (e.g. Bhagwati [12], Busch and Reinhardt [13], Chang [15, 16]). Actually, the Doha Development Agenda (2001-present) is now pending *de facto* without any successful agreements on new issues. In the international political relations, keeping diplomatic channels is itself beneficial. However, such reasons are not positive reasons for the WTO to exist. In order to find positive reasons, regarding the comparative advantage of the WTO is its ability of resolving international trade disputes, this paper considers its dispute resolutions roles in conjunction with the relations amongst the developed and developing countries as well as large and small countries.

The dispute settlement process of GATT/WTO has long history since the inauguration of the GATT or even before that based on the modern practices in Europe and the United States. The rule of dispute settlement also has improved largely when the WTO has been inaugurated (e.g. Bütler and Hauser [14]). Yet, there are some negative views against the rule especially in developing countries: The dispute resolution rules including escape clauses protect developed countries despite the GATT/WTO rules require developing countries to open their countries, which also require domestic institutional reformations, and that results in dissolving their domestic societies. It is a new colonialism.

Against such opinions, Bhagwati [12] insists such criticisms do not apply because developing countries benefit from opening their countries and obtain access to the developed countries markets. In a cost-benefit sense, even if there are some costs especially from power balances, these costs are smaller than the predicted benefits. In this paper, I provide an analytical method of explaining affirmative gains to small countries (meaning that her bargaining power is small). In addition, I provide a justification of remedy measures (e.g. Safeguards and Anti-dumping) in terms of the reciprocity rule. These arguments are expected to contribute for mutual understandings amongst developed and developing (or large

and small) countries especially in the WTO framework.

Applying the notion of Nash-threat folk theorems in repeated-game literatures, many researchers after 1990's discussed international relations under the GATT/WTO framework.[1] In this paper, as an alternative to looking at conflicts and conflict settlements, we consider the model of Becker [8] and Ehrlich [25, 27] (market model of crime). The advantage of using this Law and Economics technique is its capability of handling various realizations of state of nature in much easier way than repeated-game frameworks. We should notice that repeated-game does not allow state changes following actions of players—such classes of games are known as stochastic games whose solvable subclasses (even numerically within reasonable time) are still limited—that we may really want to analyze in the international trade models.[2] These models apply similar mechanisms to control illicit activities. Putting it into the GATT/WTO arguments, we can make analogous discussions about enforcement mechanisms. In this case, the illicit activities are violations of agreements. In both approaches, the effective expected penalties against deviations must be sufficiently higher than the expected deviations gains.

In our model, as it is considered in most of previous studies, we consider governments have incomplete information about the opponents (or country has private information about own economy and practices). These hidden information are such as contributions from interest groups and coefficients of respective welfare components. And then countries predict latent variables of the opponents using their subjective beliefs.

The discussions are developed as follows. Prior to the main argument, Sections 2 and 3 are devoted to constructing the theoretical framework. Specifically, Section 2 presents a generalized discussions about behaviors of respective players in the model. Then, applying the ideas of the market model of crime, we consider how international trade disputes are "supplied" and "demanded." The demand for disputes is indeed derived from the demand for retaliatory actions. Based on the theoretical structure developed in these two sections, we consider the benefits from the WTO affiliation with a focus on the small countries (Section 4) and consider the concession rules in Section 5 focusing on large countries. In these sections, "small" and "large" are used for convenience to indicate countries having less and more bargaining powers in trade negotiations. The argument on the rule is based on the phenomenon of *reciprocity* often discussed in the GATT/WTO context. We then further discuss the possibility of sustainable expansion of WTO in Section 6. Finally, we conclude in Section 7 and discuss a possible extension for further improvements in the dispute settlement process of the WTO. Throughout the paper, we abbreviate the dispute-settlement related rules and practices simply as DSU or GATT-DSP and WTO-DSU especially when we need to classify the dispute settlement procedure respectively in the GATT and the WTO.

2 Underlying Political-Economy Structure

We consider international economics and policy making of two countries under an institutional framework (e.g. GATT/WTO). Countries are conventionally referred as *Home* and *Foreign*. These two countries trade each other goods. For convenience, we denote most of variables of Home by upper case letters and Foreign by lower case letters.

In general, policies of a country consist of various policy instruments and its effectiveness

is determined by interactions amongst policies conditional on the fundamental domestic and international environment represented by θ (say state of economy). In order to stylize this phenomenon, we consider representing a policy package by vectors of policy indicators (or effective tariffs and subsidies) $\boldsymbol{T}$ and $\boldsymbol{t}$. Thus, the policy package to evaluate effectiveness is represented by $\{\boldsymbol{T}, \boldsymbol{t}\}$.

In order to make the problem be analyzed relatively more easily, we assume there exists an outcome measure function for each country (Home and Foreign) that maps $\{\boldsymbol{T}, \boldsymbol{t}\}$ into the Euclidean space conditional on θ, which is, for the Home government for example, represented by $W(\theta)(\boldsymbol{T}, \boldsymbol{t}) \subset \mathbb{R}$. This social welfare function is actually the politically augmented social welfare function obtained by solving the corresponding general equilibrium model.[3] In particular, this function consists of weighted consumers' and producers' surpluses, tax revenues, and political contributions to the government.[4] In general, weights on each term are also recursively altered by political contributions from each group as well.

Now consider how policy indicators can be determined. Let $\{\boldsymbol{T}, \boldsymbol{t}\}$ be referred as "tariffs" henceforth. These tariffs are naturally decomposed into nominal tariff rates and NTBs, where measurements of NTBs are supposed to be consistent with the corresponding tariff rates. Note, in practice, because nominal tariffs are observable, deviations instruments we are discussing in later sections are NTBs in most cases. These NTBs are implemented by the government as laws and regulations and by the society as norms and practices. Laws and regulations are codified in conjunction with political-economy objectives of the government authorities (involving firms and interest groups). And norms and practices are established by players of each economy: firms, consumers, activists, *etc*... Furthermore, we classify active political-economy groups in the model into two groups: firms and special interest groups. The roles of these two groups are discussed in Sections 2.1 and 2.2. Then we further discuss the objectives of the government and agreements in Section 2.3.

2.1 Firms

In general, some firms may be able to behave strategically meaning that those firms possess some market power or form interest groups. For now, let me focus on the first possibility because we discuss the latter possibility in the next subsection. When firms have some market power, their production or pricing strategies, which are determined through strategic interactions amongst firms, are determined conditional on state of economy θ and policy choices of the two governments $\{\boldsymbol{T}, \boldsymbol{t}\}$. For example, as well as nominal tariffs, policy packages in our mind here are NTBs such as antidumping laws, product standards, non-tariff customs regulations, *etc*...

In order to fix the underlying idea, now let me approximate behaviors of firms using game theoretic thinking. Consider firms that have some market power and behave strategically. If they apply static Nash equilibriums with a given policy package, they have no incentive to deviate so long as the fundamentals of the economy, which is a part of state of economy θ, does not change. Because changes in fundamentals obviously affect firms' behaviors, for now, suppose the fundamentals are fixed. Then, using the static Nash equilibriums, consider enforcing a cooperative strategy profile amongst firms (tacit cooperations).

Notice, however, if there is no imperfectness of information, no firm will deviate from the tacit rule so long as firms behave rationally without making any mistakes. Then, in

order to make things interesting and realistic, suppose there is some degree of monitoring imperfectness and firms react to observable signals (e.g. Green and Porter [31] and Porter [56]). In this case, realizing strategy profiles will change in response to these signals if sufficiently large possibilities of deviations from the tacit rules are indicated. Subsequently their behaviors changes may influence the international trade agreement even though the government keeps the agreed policies. These changes affect the effectiveness of policies $\{\boldsymbol{T}, \boldsymbol{t}\}$ as well as the status quo state of economy θ and, in some cases, therefore, such firms' behaviors may trigger international disputes as it will be discussed in Section 3.

To get some intuition, dumping is a good example for this argument. Suppose firms in a certain industry know dumping competition brings pessimal outcomes for most of firms. In this case, the threat is the dumping competition. Then, they behave cooperatively unless sufficiently significant signals of deviations are observed. In other words, these firms trigger dumping competition once the signal appears. To some extent, the government can control their behavior to stop the competition. However, in some cases, the government is incapable of regulating dumping resulting in violation of the international trade agreements.

2.2 Interest Groups

Interest groups are various kinds of: active consumers, labor unions, environmentalist groups, human rights activists, industry related groups, *etc...* These groups try to orient policies toward their interests using their own resources or hiring professional lobbyists. In the following discussions, we consider groups which are interested in influencing trade policies. Traditionally, consumers and industries groups have involved in the GATT/WTO and other international trade issues but recently other groups appear active.

Existence of special interest groups in policy making processes and their influences are a well-known fact. For example, Goldberg and Maggi [29] show the US trade policies are empirically consistent with the argument of Grossman and Helpman [35] indicating that the presence of interest groups effectively affects political decisions; and a quite recent empirical result by Coates et al. [18] suggests influences of interest groups on policies to reduce volatility, where reducing volatility indicates making dispute cases in our contexts because violations of trade agreements are to nullify unforeseen contingencies.

In order to fix the underlying idea for further discussions, let me approximate interest groups behaviors using the menu-auction theory (Bernheim and Whinston [9] and Grossman and Helpman [35]). Then the schedule of the amount of contributions for each policy package is determined conditional on the state of economy. Whence, if the state of economy has changed, the contribution schedule also changes. These changes come from firms' strategic behaviors and exogenous parameter shifts such as recent health and environmental issues. Accordingly, the respective objective functions of the governments change. This kind of phenomenon of "change" is also emphasized, for example, by Barton et al. [7] and Bhagwati [12]. In these studies, especially the change after the 1999 riot against WTO meeting in Seattle, WA is emphasized but the situation has been more or less similar before 1999. Just NGOs and environmental and labor activists who are against globalization have come out as new interest groups in the negotiation stages.

Notice, however, the change in the state may or may not alter the attitudes of the governments toward the compliance of international trade agreements. For example, a change

may be so small that violating an agreement does not benefit the government. However, a sufficiently big change brings violations of the agreement because of sufficiently large gains to the government. For example, extremely rapid and large expansions in volumes of imports of particular goods induce large increases in political contributions for more protective policies to shift the government policy even if consumers are benefitting from the increased imports. Of course, this outcome is not immediate because exporting industries may be injured by retaliatory actions by the opponent country and that may increase contributions for policies away from protective actions. The policy will be determined via strategic interactions amongst these industries and politicians.

In our model, actions of interest groups alter the preference of the government via θ resulting in altering trade policies ($\boldsymbol{T}$ for Home and $\boldsymbol{t}$ for Foreign). In addition, some interest groups may be capable of affecting $\boldsymbol{T}$ and $\boldsymbol{t}$ directly if they can affect related norms and practices. In addition, some of interest groups may organize across some other groups to materialize their mutual objectives. These movements are often seen in environmental issues in the WTO (e.g. Barton et al. [7]).

2.3 Objectives of the Government and Agreement

In the previous two subsections, we have seen how firms and interest groups can affect our model parameters. With these notions in mind, we consider objectives of the government to define the static Nash equilibrium "between two governments" and then we fix our idea when agreements and enforcement mechanisms are needed.

Now consider the government of Home that is supposed to maximize the expected politically augmented social welfare function subject to the present state of economy and policies of the opponent (and *vice versa* for Foreign). In this sense, we are looking at policy making decisions for the next period on conditional on the current state of economy (or status quo). Then the best response of the government to maximize W for a given status quo $\bar{\theta}$ is:

$$\boldsymbol{T}^{*} = B\left(\bar{\theta}\right)\left(\boldsymbol{t}\right) \equiv \arg\max_{\boldsymbol{T}} \; E\left(\bar{\theta}\right) \circ W\left(\theta\right)\left(\boldsymbol{T}, \boldsymbol{t}\right),$$

where $E\left(\bar{\theta}\right)$ is the expectation operator about θ conditional on $\bar{\theta}$. Similarly, for Foreign, we can give $\boldsymbol{t}^{*}$ by $\boldsymbol{t}^{*} = b\left(\bar{\theta}\right)\left(\boldsymbol{T}\right)$. Therefore, substituting $\boldsymbol{t}^{*}$ into $\boldsymbol{T}^{*}$ and setting $\boldsymbol{T} = \boldsymbol{T}^{*}$, the instantaneous optimization problem gives an equilibrium by solving a fixed point problem such that $\boldsymbol{T}^{*} = B\left(\bar{\theta}\right)\left[b\left(\bar{\theta}\right)\left(\boldsymbol{T}^{*}\right)\right]$.

The solution to the above problem is termed a *static Nash equilibrium* and it is denoted by $\{\boldsymbol{T}^{NE}\left(\bar{\theta}\right), \boldsymbol{t}^{NE}\left(\bar{\theta}\right)\}$ or simply $\{\boldsymbol{T}^{NE}, \boldsymbol{t}^{NE}\}$ dropping $\bar{\theta}$ so long as it does not make confusions. The sufficient conditions for the existence of at least one pure strategy static Nash equilibrium, which are implicitly assumed in the following discussions, are as such $\boldsymbol{T}$ and $\boldsymbol{t}$ are both in compact and convex regions, and W and w are both continuous in $\{\boldsymbol{T}, \boldsymbol{t}\}$ for each θ (notice, the best responses are choice functions).[5]

If the static Nash equilibrium, which is self-enforcing and self-fulfilling, is the first best, there is no need of ratifying agreements including implementation rules. Thus, there is a better policy package (or Pareto improving) if countries are looking for possibilities of an agreement with implementation rules. In particular, there are two possible game classes: prisoners' dilemma and coordination games. The prisoners' dilemma type games are as

such there is at least a Pareto improving strategy profile but it is not self-satisfying and self-fulfillment because of existence of better payoffs from unilateral deviations. The coordination games are as such there is at least a better static Nash equilibrium than another Nash equilibrium (whence multiple static Nash equilibrium cases apply). Payoff structures of these two classes of games are the potentially fundamental payoff structures for the governments.

If there is no agreement, Home and Foreign apply policy package $\{\boldsymbol{T}^{NE}, \boldsymbol{t}^{NE}\}$ that brings the smaller volumes of trade than the other better policy packages in prisoners' dilemma type games. Suppose both Home and Foreign believe freer trade is better. Then, the agreement will be made on the point where the losses are equal to the gains from the new agreement. The losses mainly emanate from losing political supports of import competing industries and adjustment costs of industrial changes. And the gains mainly accrue from obtaining political supports of export competing industries and traditional gains from trade. However, agreements apart from $\{\boldsymbol{T}^{NE}, \boldsymbol{t}^{NE}\}$ usually entail incentives of deviations.[6]

Enforcement mechanisms are more or less stick-and-carrot rules. In order to implement the new agreement $\{\boldsymbol{T}^{A}, \boldsymbol{t}^{A}\}$, the penalties against deviations are given by other policy packages, denote $\{\boldsymbol{T}^{B}, \boldsymbol{t}^{B}\}$, attaining less welfare levels and that is ultimately enforced by the pessimal policy $\{\boldsymbol{T}^{NE}, \boldsymbol{t}^{NE}\}$. In this sense, as introduced by Dixit [21], any policies better than the pessimal package are enforceable (Nash-threat folk theorem).

In order to introduce an identification system against violations, consider the following mechanism similar to the trigger strategy.[7] The governments receive public signals but the signals include disturbances. In this sense, the governments claim violations only if the signals show sufficient deviations from the predicted levels (trigger strategy). For example, for the realized error vector $\boldsymbol{e}$ and policy measure μ, Foreign begins suspecting deviations if $\mu(\boldsymbol{T}^{A} \pm \boldsymbol{e})$ exceeds some critical values conditional on own effective policies.

3 Market for International Trade Disputes

Prior to the main discussion, we define the gains and losses from violations. As ordinary demand and supply systems, by maximizing the objective function (e.g. politically augmented social welfare function), we will find various markets for disputes and we will find respective gains and losses. In the following discussions, we consider a market for disputes such as automobiles, steels, textiles, agricultural products, *etc...* However, violations and retaliations that we will be discussing are not completely independent but they are intrinsically dependent on each other – for example, violations in agricultural products may result in retaliations in manufacturing sectors, or may result in counter actions in noneconomic international relations. In addition, in the following discussions, we use "dispute case" mainly based on GATT Articles XXII and XXIII and "remedy measure" mainly based on GATT Articles VI and XIX conforming the definitions below.

Definition 1 (Dispute Case) *A dispute appears if a country deviates from the agreement and it is identified. Then, the punishment policy is implemented for a certain period if the violation is not corrected in accordance with admonishments of the Appellate Body, say. After this punishment phase, the agreed policy is applied (if it is feasible).*

Definition 2 (Remedy Measure) *A remedy measure is applied if it is approved as an exception of the agreement. Then, the remedy policy is applied for a certain period without retaliatory actions by the opponent. After the remedy phase, the agreed policy is applied. If the petition for remedy is not approved, it will be a dispute case.*

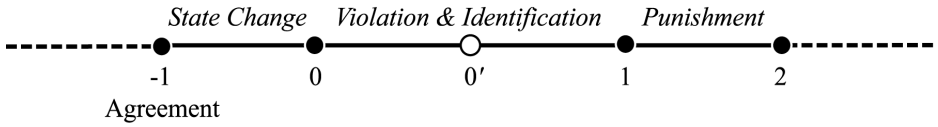


Figure 1: Time-line of Disputes

Let θ_i be the state of economy at phase i, where the phases are classified into four stages: $i = -1$ is the phase in which the trade agreement is ratified; $i = 0$ is the phase in which a deviation has been induced and a potential dispute case arises; $i = 1$ is the punishment phase; and $i = 2$ is the phase after the punishment. These time-line is depicted by Figure 1. Note, neither $\theta_{-1} = \theta_2$ nor $\theta_0 = \theta_2$ hold in general because the state of economy, which includes all factors such as firms' behavior and contributions schedules, may change after policy changes. A similar stage classification is also considered by Bütler and Hauser [14] within their extensive form game (the punishment stage is alternatively termed as the implementation stage) and actual disputes and retaliations, legal structures, legal techniques, and injuries estimations are recently summarized and discussed in Shadikhodjaev [66].

Now suppose the state changes from θ_{-1} to θ_0 and, without loss of the generality, the Home government is expected to experience some losses. Let Λ^H be present value of net expected differential gains from deviation of the Home government when Foreign is assumed to be unable to (or unwilling to) effectively retaliate the deviation. In Figure 1, this situation is indicated by vanishing the punishment phase. Then, the government of Home has incentives to implement violating policies if $\Lambda^H > 0$. Therefore, if the Foreign government is assumed to be capable of effectively retaliating Home by implementing a policy package $\{\boldsymbol{T}^B, \boldsymbol{t}^B\}$, then, it implies this policy package brings non-positive net gains to the Home government.

In turn, let λ^H be present value of net differential losses from deviation of the Foreign government when the foreign government is unable to (or unwilling to) effectively retaliate the Home government. The Foreign government has incentives to retaliate if $\lambda^H < 0$ (if this is not the case, as discussed in Section 2.3, renegotiated agreement is applied). In this case, $\{\boldsymbol{T}^B, \boldsymbol{t}^B\}$ is applied after the identification process if the Home government does not conform to the decision of, say, the Appellate Body. If the Foreign government confirms to the decision, again the initial agreement is implemented (notice, however, the effectiveness of the agreement $\{\boldsymbol{T}^A, \boldsymbol{t}^A\}$ may be different from under the status quo).

In analogous ways, we can define Λ^F and λ^F indicating the losses and gains respectively for the Home and Foreign governments when the Foreign government is expected to experience some losses from another state change. Using these values, the following two subsections (Sections 3.1 and 3) derive the supply and demand functions of international disputes. Subsequently, the interpretations of Λ's and λ's within the model become much clearer after deriving these supply and demand functions.

3.1 Unilateral Supply of Disputes

Consider supplies of disputes in a certain "market for dispute." Because impacts of disputes usually differ from each other in the real world, the impacts of "disputes" in the following arguments are supposed to be *normalized* to be equal to each other. Thus, a minor dispute and a major dispute are not counted as one dispute. The minor one may be one but the major one shall be greater than one in our measure. Then, the frequency of dispute cases are determined by the net gains and losses.

The same values of these gains and losses do not attain the same frequency of dispute cases because there are various sectors and preferences. This is also the case when we look at the real world: a major issue of trade dispute and many minor issues of trade disputes may attain the same gains and losses levels. This phenomenon also applies to the normalized disputes. Frequencies of normalized disputes conditional on the state of economy then conform to a probability density function. Therefore, in order to make discussions based on "supply functions," we consider "expected" frequencies of normalized dispute cases.

Let Ω^s and ω^s respectively be the expected "unilateral" supplies of disputes by Home and Foreign—we simply refer them as *disputes* or *dispute cases*, or alternatively supply functions henceforth. For the unilateral case, suppose the opponents are incapable of implementing retaliatory policies. As considered by Ehrlich [25, 27] within the context of supply of offenses, suppose the supply depends on the expected net gains of offenders. In international trade, the costs of supplying potential dispute are only dealing costs of such policies (if they exist) and the supply function is actually the best response function against the state of economy θ. For example, these costs are such as changes in contributions schedules, coordinations amongst interest groups, and negotiations with affected countries as well as economic distortions. Note, disputes (and punishments) in international trade are implemented by respective countries and their gains and losses are not generally equal to each other.

Let $\Omega^s = \Gamma(\Lambda^H)$ and $\omega^s = \gamma(\lambda^F)$ respectively be the corresponding supply functions of Home and Foreign. These functions are given by equating the marginal benefits and the marginal costs from violations (Ω and ω respectively). In principle, disputes are supplied by both firms and governments, and firms focuses on their own markets. Λ^H and λ^F are not directly linked to the payoffs to each firm but it is reasonable to see the gains for the governments Λ^H and λ^F are increasing in potential dispute cases via producers' surpluses and contributions. This kind of ordering for dealing with potential dispute cases can also be analogously argued by using the logic of resource allocations of both the juries and accused in court trials: more resources are allocated for more serious issues (e.g. Landes [45] and Gould [30]). In our case, the severity is the predicted potential injury for the domestic economy.

Proposition 1 *In international trade disputes, the dispute supply function is actually the best response function of the deviator against the state of economy. Then the expected supply of normalized disputes by the government is non-decreasing in the realized net expected gains.*

For firms, whether or not to change strategies depends on the strategic structures of respective markets but we cannot make detailed discussions about firms' behavior because the structure of each non-competitive market is not specified. However, we can say some definitive things. If firms do not behave collusively, there is no dispute because the effectiveness of policies is defined inclusive of those firms' behaviors and firms in such markets play

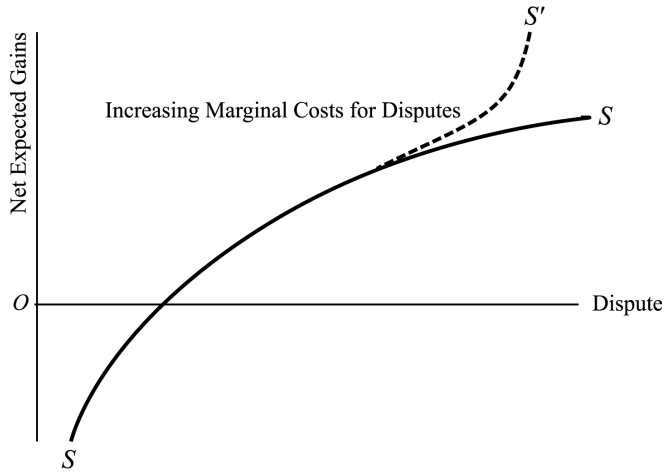


Figure 2: Expected Unilateral Supply of Dispute

respective markets' static Nash equilibriums. However, if the firms collude, the effectiveness of policies will not take into account for punitive actions amongst firms that usually show non-collusive behaviors, and then these non-collusive behaviors may be the causes of disputes. Subsequently, although governments are rational, disputes are provided by the firms even if $\Lambda^H \leq 0$ and $\lambda^F \leq 0$ hold for the respective governments.

Proposition 2 *The supply of dispute by the country can be strictly positive even if the realized net expected gains are non-positive.*

In such cases, however, the slope of the supply function is ambiguous when the net gains are negative. For simplicity, we can assume expected frequencies of dispute cases caused by firms are non-decreasing respectively in Λ^H and λ^F. For example, as injuries of an industry get severer, their interest groups will increase contributions to alter the objective function of the government resulting in generating correspondingly larger losses. Even if its value still remains negative and no official action is taken by the government, the increase in the net gains indicates the corresponding increase in the probability of disputes by the firms. Suppose the dispute supply of the firms is non-decreasing in the net expected gains for the government. Then, Propositions 1 and 2 imply the slope of dispute supply functions are positive: $\partial\Omega^s/\partial\Lambda^H > 0$ and $\partial\omega^s/\partial\lambda^F > 0$.

As a benchmark case, suppose there is no cost of disputing, dispute cases are supplied increasingly in the net expected gains as much as they need. Then, for cases in which Home and Foreign respectively deviate first, we can find the *expected supply functions of normalized disputes* without dispute-administration costs are depicted by the locus labeled by SS in Figure 2.

Now consider administrations costs of disputes for the governments. Existence of such costs uniformly reduces supply of disputes for all net expected gains levels. If these costs do not increase sufficiently, dispute cases increase as the net gains increase subject to the supply function without the costs (SS in Figure 2). For example, these cases will appear when countries effectively deal with dispute issues in inclusive talks. In turn, if the administrations

costs increase greatly, these costs suppress exponential increases in disputes. Therefore, increases of disputes diminishes as potential dispute cases increase as shown by SS' in Figure 2. For example, these cases will appear when countries deal with each dispute issue separately or inclusive deals are not sufficiently effective. We consider the case depicted by SS' is more likely the case in the following discussion but it does not alter the arguments.

3.2 Derived Demand for Disputes

"Demand" for disputes is derived from incapability (or unwillingness) of deterring deviations of the opponent. Any disputes impose various costs—for example, menu costs especially for firms; political coordinations costs especially for governments; and negotiations (diplomacy), investigations and monitoring costs for both firms and governments. And firms and governments are both constrained by their actions. Subject to these constraints, respective objective functions are optimized. Therefore, demand for disputes are derived from maximizing benefits from deterring violations subject to policy feasibility and dealing costs.

For now, suppose there is no feasibility constraint on retaliatory actions. In this case, costs of handling disputes determine the demand for retaliatory actions to derive the dispute demand. To derive the demand function, we consider the supply of dispute cases are sufficiently large and the targeted country maximizes their welfare in terms of the cost and benefit from deterrence. Costs are such as dispute identifications and diplomatic expenditures and related human resource allocations. Then, the demand for disputes is given by the complement numbers of deterred dispute cases.[8]

For more detail, consider the dispute demand as a function of the net expected losses for the government. We make discussions based on the objective function of the government as in derivations of the supply because it conceptually includes political pressures from injured industries to represent their preferences. If the losses from opponents' deviations are small, the benefits are not large comparing to the costs. Then, the countries allow relatively larger frequencies of dispute cases. However, as losses get larger, these benefits get larger and the countries allow less frequencies of dispute cases. Therefore, the "derived demand" for disputes respectively for Home and Foreign are respectively given by $\Omega^d = D(-\Lambda^F)$ such that $\partial\Omega^d/\partial(-\Lambda^F) < 0$ and $\Omega^d \mapsto 0$ as $-\Lambda^F \mapsto \infty$, and $\omega^d = d(-\lambda^H)$ such that $\partial\omega^d/\partial(-\lambda^H) < 0$ and $\omega^d \mapsto 0$ as $-\lambda^H \mapsto \infty$. Then, such a demand function is depicted by DD in Figure 3.[9] Notice, since the net gains and losses are functions of the state of economy, respective supplies of dispute cases are indeed conditional on θ.

Note, the DD-curve in response to opponent's supplies of disputes is depicted also for the negative quadrant representing the cases in which firms get dispute cases because the targeted industries by the deviations indicated by the negative quadrant do not prefer not-to-retaliate, the demand does not goes to infinity even if there were no dispute-administration costs for the governments.

Next, consider the feasibility constraint on retaliatory policies. In the real world, the power of nations and the structure of disputed markets determine the feasibility of retaliatory policies. A recent empirical result by Bagwell and Staiger [5] suggests influences of such policy feasibility constraints as well as political factors on trade negotiations in WTO. The effective-policy feasibility postulates constraints on demand for retaliatory actions shifting the dispute demand function rightward. Furthermore, if there is no effective policy to retali-

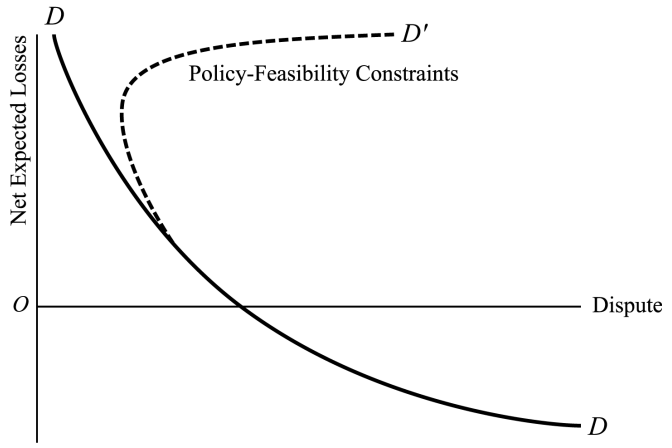


Figure 3: Derived Expected Demand for Disputes

ate opponents, the derived demand attains extremely large values because there is no policy choice against deviations. In order to effectively retaliate, the harmed country must provide sufficiently large penalties. However, as the required severity of penalties increase, feasibility of policies gets more restrictive.[10] Therefore, insomuch as our losses and opponent's gains are positively correlated, larger losses entail more strict feasibility constraint because opponent's gains are correspondingly larger. Consequently the derived demand for disputes will start increasing if the losses exceed a threshold level as depicted as the backward-bending curve in Figure 3 labeled by DD'. In traditional arguments without political augmentations of objective functions are known as Johnson's case after Johnson [41] and Riezman [59]. Because our model augment objective functions by political interests, Johnson's case more likely happens than non-augmented cases even if country sizes are similar.[11] Formally, we propose:

Proposition 3 *Suppose losses of our country is positively correlated to gains of opponent country. If there are policy-feasibility constraints, then, the derived demand function for disputes is a backward-bending function.*

3.3 Realizing Dispute Cases

Prior to discuss equilibrium, consider transformations between the net expected gains and losses of the two countries. Suppose these gains and losses are negatively correlated. If such a case exists after the state change from θ_{-1} to θ_0, it indicates there exists policy package $\{\boldsymbol{T}^B(\theta_1), \boldsymbol{t}^B(\theta_1)\}$ that is Pareto-superior to initial agreement $\{\boldsymbol{T}^A(\theta_0), \boldsymbol{t}^A(\theta_0)\}$. In the traditional arguments in economics of GATT/WTO, such negotiations are implemented by *reciprocity* that requires no change in terms-of-trade (e.g. Bagwell and Staiger [3, pp.57-70]). In addition, for another example, suppose $\Lambda^H < 0$ and $\lambda^H < 0$ hold. These cases are mainly caused by firms' behaviors as we have discussed in the previous sections. Then, it is better for both governments to renegotiate alternative policies focusing on regulating firms than to implement the penal code trade policies.

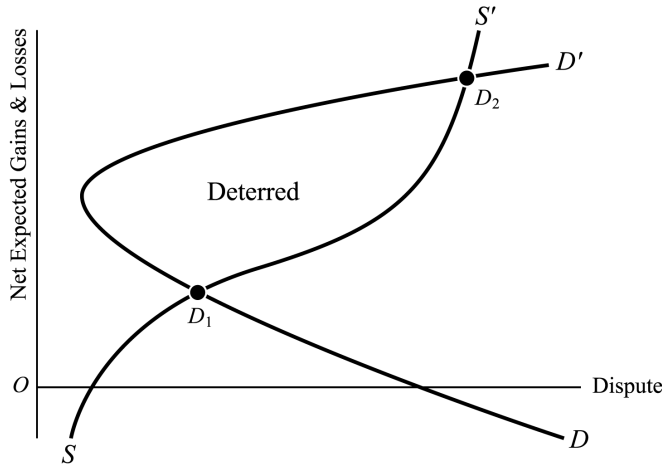


Figure 4: An Illustration of Dispute Market

Formally, let $-\Lambda^F = \Phi(\lambda^F)$ and $-\lambda^H = \phi(\Lambda^H)$ be the transformations functions between respective losses and gains in a certain market for disputes. With this specification, above renegotiations cases apply to cases in which one of $-\partial\Lambda^F/\partial\lambda^F \leq 0$ and $-\partial\lambda^H/\partial\Lambda^H \leq 0$ holds.

In turn, suppose gains and losses are positively correlated, so that, $-\partial\Lambda^F/\partial\lambda^F > 0$ and $-\partial\lambda^H/\partial\Lambda^H > 0$ hold. Then, disputes may arise because $\Lambda^H > 0$ entails $\lambda^H < 0$ and $\Lambda^F < 0$ entails $\lambda^F > 0$. Thus we focus on these cases of positive correlations in order to discuss the equilibrium for "disputes" in the following arguments

The difference from the market equilibrium of offenses discussed by Ehrlich [25, 27] is that the losses from disputes are dependent on contingencies to some extent—in Ehrlich's model, the expected losses (loots) are determined by expenditures of potential victims on self-protection devices and public enforcement parameters. In our case, "loots" are determined by the state of economy, therefore, the vertical axis determines the expected frequencies of dispute cases (horizontal axis).

Consider putting the supply and demand functions into one diagram (Figure 4). In the figure, we consider a case where there are policy-feasibility constraints and marginal administration costs are large when there are lots of disputes. Of course, it is not necessarily true that there are two intersections as denoted by D_1 and D_2. As we have discussed in derivations of the supply and demand functions, their shapes are dependent on administrations costs and policy feasibility. In addition, relative positions of supply and demand depend on relative relationships of countries represented by transformation functions Φ and ϕ. So that, intersections do not necessarily exist. Note, we also cannot exclude cases in which supply and demand functions intersect more than twice. These multiple intersections occur when the supply function has a flatter segment relative to the demand function. Anyway, the following discussion about frequencies of disputes is not affected.

Caution again that the state of economy represented by the net expected gains and losses (vertical axis) determines the potential demand and supply represented by the horizontal axis, and the reverse is not true.

Suppose a realized state attains *more* dispute supplies than dispute demands. In Figure 4, such a possibility is indicated by the expected gains and (transformed) losses between D_1 and D_2. In this segment, the potentially harmed country effectively prepares for retaliating actions against violations of the agreement. Therefore, "supplied" dispute cases more than the "demand" are deterred. In turn, suppose a realized state attains *less* dispute supplies than the demands. In Figure 4, such a possibility is indicated by the expected gains and losses less than D_1 and more than D_2. In this segment, the potentially harmed country does not prepare for retaliations, so that, "supplied" dispute cases are not deterred. Letting $\Omega^* \equiv \Omega(\Lambda^H)$ and $\omega^* \equiv \omega(\lambda^F)$ respectively be realizing dispute cases for each state, therefore, these functions are respectively algebraically expressed as

$$\Omega^* = \min\{\Gamma(\Lambda^H), d[\phi(\Lambda^H)]\} \quad \text{and} \quad \omega^* = \min\{\gamma(\lambda^F), D[\Phi(\lambda^F)]\}.$$

The implication of the "deterred" segment is as follows. Inasmuch as the expected losses from disputes are not large (less than D_1), the potentially harmed countries do not make large efforts to deter predicted violations. However, as the threats of damages go up, they start preparing for retaliatory actions (between D_1 and D_2). While they have sufficient alternative policies effective on violations, arising disputes decreases as the threats increase. However, feasible alternatives decrease as the expected losses rise because the expected losses are positively correlated to the expected gains of the opponents. Then, arising disputes again start increasing as the losses increase. Finally, by incapability of retaliatory actions, the supply determines the frequencies of disputes (more than D_2).

4 Gains from WTO-Affiliation for Small Countries

For convenience, in terms of politically augmented objective functions and effective-policy feasibility, a country without strong bargaining power are referred as a "small country" and a country with strong bargaining power as a "large country." Whether a country is small or large will depends on the relative bargaining power in respective dispute markets. In this sense, a country may be large in some markets but it is small in the other markets.[12]

Consider the change in the locus of demand function of a small country induced by acceptance to WTO. The loci of the supply of and the demand for disputes are determined relatively reflecting political economy structures and the power of each country. Suppose a country is relatively smaller than their trade partner. Are they able to reach equivalent trade liberalizations agreements without affiliating with WTO? The truth is ambiguous but they can do in principle because the origins of GATT are bilateral trade agreements during 1930's between the United States and the United Kingdom and their trade partners were the typically smaller than US and UK. Actually the GATT has continued to exist nearly a half century without any organizational body and the WTO seems to fail to deal with the initial round. On this regard, recently Rose [63] has shown an empirical result proposing the Organisation for Economic Co-operation and Development (OECD) has the most significant trade promotion effect and GATT/WTO has much smaller impact than OECD has. In this sense, the pure gains from affiliating the WTO are neither gains from trade nor gains from collective talks. In addition, recent movements of regional trade areas are alternatives to the WTO-affiliation—GATT XXIV allows formations of preferential trade areas amongst

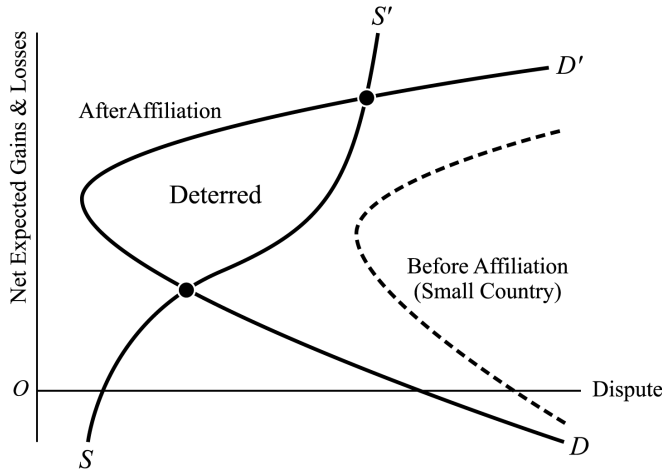


Figure 5: Change in Relative Power

WTO members but there are no affirmative promotions. Of course, there are gains from collective deals but again dealing places are not necessarily in WTO even if talks are based on GATT. The only characteristic feature of WTO in the contemporary international society is the formal dispute settlement processes that affect bargaining powers of its members. With these notions, as a measurement of affirmative gains and losses from WTO-affiliation, we focus on gains and losses of bargaining powers represented by the relative relations between supply and demand functions.

Now consider the demand for disputes by the small country in relation to the supply by the large country. Suppose gains of the larger country and the losses of the small country is positively correlated. If the small country is sufficiently small, they have nothing to do with violations of the agreement because they have no effective retaliatory policies. Applying the market model for disputes, such a case is depicted by the dashed curve in Figure 5. The dashed curve shifts leftward as their capability of retaliatory actions improve, and the backward-bending segment shifts upward if improvements in policy-feasibility are accompanied. If affiliating WTO makes the shifts in the demand curve as depicted by the solid demand curve in Figure 5, the gains are the "Deterred" area in an expectation measure.[13] Therefore, there arise one of "affirmative gains" from affiliations for small countries if WTO has a comparative advantage in providing improvements in their positions against large countries.

The shift of the "derived" demand function is induced by factors such as improvements in capability of identification and in effectiveness of (threat of) existing retaliatory policies, and expanded feasibility of effective policy choices. The capability of identification reduces the monitoring costs against deviations. Coalitions for information sharing have been common practices in business world.[14]

For countries, especially small ones, monitoring costs are large because it requires large amounts of human resources and special knowledge. If countries frequently fail to identify deviations, their derived demands for disputes become accordingly larger because deterring deviations are impossible. These monitoring tasks are assigned to specialized agencies like

the International Trade Commission (ITC) in the United States but such agencies are not effective in most of small countries. If these costs are reduced (by affiliation), identifications of deviations become much easier to implement appropriate actions: Petition to the authority or simply retaliate. Under DSU of WTO, affiliated members can reduce their own costs of detecting deviations to make the leftward shift of the demand function insomuch that WTO provides Appellate Body with sufficient human resources and accumulated experiences. In addition, reports about domestic economy and trading practices help information acquisitions of member countries. Collections of information about trade could be impossible for most countries without the WTO.

Complementarily to reductions in the monitoring cost, harmed countries can implement retaliatory policies in more effective ways. For example, suppose a country received suspicious signals but they cannot identify exactly what kinds of violations are actually done. In such cases, policy choices are constrained by the available information. In addition, the most effective policy choice against the true violation type may not be done in the presence of asymmetric information. Therefore, information acquisition schemes provided by the WTO also induce the leftward shift of the demand function via policy effectiveness and policy instrument choice.

As another effect, consider the upward shifts in the upper-half segment of the demand function. The upward shifts may be induced by the improvements in information acquisitions capabilities because accurate information reduce search costs of appropriate policies. However, the WTO can provide another source of the shift based on the Multilateralism as suggested by Ethier [24], Maggi [49], and Shadikhodjaev [66] for example. In this case, Multilateralism provides a sort of public enforcement mechanism. Then, it reinforces multilateral cooperation and further tariff reduction (e.g. Bhagwati [11] and Ethier [23, 24]). Conceptually, we can consider the demand function as the average of a group of countries theoretically consistent because the objective functions are defined in the surplus measure. This reformation increases effective policy alternatives because the country size (or power) increases. These multilateral punishment schemes can be represented both by the leftward shifts and the upward shifts of the upper-half segment.

Finally, we should notice that efforts of the Advisory Centre on WTO Law to provide advisory services and educational programs for member countries reinforce the shifts of the demand function because these attempts ease human resource constraints. In addition, these knowledge accumulations supports enhance policy choices that may induce another shift. Then, we can say there are sufficient reasons to provide affirmative gains from affiliating with the WTO for developing and small countries. These gains are mainly provided by DSU and reinforced by the efforts supporting powerless countries.

Proposition 4 *Small countries gain from WTO affiliations by bargaining-power improvements and expanded policy feasibility. These gains are reinforced by DSU, Multilateralism, and advisory and educational services of the WTO.*

5 Reciprocating Bargaining Power Gains

We have seen there are sufficient reasons to generate affirmative gains from WTO affiliation for small countries. However, it is doubtful for large countries. For large countries, improve-

ments in the position of the dispute demand of small countries indicate losing own bargaining powers. For small countries, the situations are similar but their deteriorated bargaining powers due to a large country's affiliation with the WTO are compensated by accompanied improvements in their bargaining powers. In contrast, the corresponding improvements for large countries are marginal because they already have large bargaining powers. In addition, large countries seem to generate equivalent gains from trade with unilateral actions without giving up their bargaining power. For example, the United States Government frequently has issued threats of applications of Section 301 and Super 301 in 1980's and 1990's negotiations scenes. Actually these threats derived lots of concessions and took a role as penalties against unfavorable trade partners' answers to the United States (McMillan [54]).[15] Furthermore, rules of DSU restrict policy choices of large countries to push down the upper-half of their dispute demand function. Therefore, affirmative gains from WTO affiliation for large countries are seemingly very small. Then, why economic super powers like the United States and the European Union should stay in WTO? In order to keep such large countries, the WTO must provide reasonable gains for members' affiliation. During the Cold War, it could be done by ideological reasons but it was over.

Now consider applying *reciprocity* to the argument of compensating losses in bargaining powers of larger countries. Reciprocity has been one of the core philosophy in the jurisprudence of GATT. In simpler words, it is to exchange gains and losses in order to equilibrate each other's benefits. Therefore, larger countries are to receive equivalent concessions from smaller countries.

If we apply the reciprocity to our argument, small countries need to return almost all of affirmative gains from their WTO affiliation. Some parts of small countries' affirmative gains are contingently returned to their trade partners (regardless of countries' power) via Safeguards (GATT XIX) that allows remedy from severe injuries caused by international trade and unforeseen contingencies. However, if large countries are less risk averse comparing to small countries, very small concessions are enough to compensate bargaining power losses of large countries.[16] Additionally, large countries can also reduce administrations costs of dispute settlements using agreed rules in the WTO framework. Concerning relative risk preferences and reduced dispute settlements costs for large countries, now we focus on picking up some attempts (regardless of explicit or implicit) to derive concessions to generate affirmative gains. Then we consider rules and norms in terms of reciprocity such as Safeguards and Anti-dumping, and Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) and General Agreement on Trade in Services (GATS).

Although it had triggered ratifying Safeguards Code (later Agreement on Safeguards), mostly during 1970's between the United States (large) and Japan (small), voluntary export restraints (VERs) were used in order to exchange concessions. Safeguards and VERs could directly affect the "Deterred" area of trade partners for some "unforeseen" contingencies. Now VERs are successfully banned under the auspices of the GATT/WTO framework. Thus, focus on Safeguards. In the theory, however, "unforeseen contingencies" mentioned in Article XIX and the Agreement on Safeguards are hard to interpret as it is insomuch as a probability distribution function of contingencies is to be defined. In the theory, it is better to interpret unforeseen contingencies as events that occur much less frequently.

Suppose a state θ attaining higher net expected gains realizes less likely than another state θ' attaining less higher net expected gains. This assumption implies the prediction

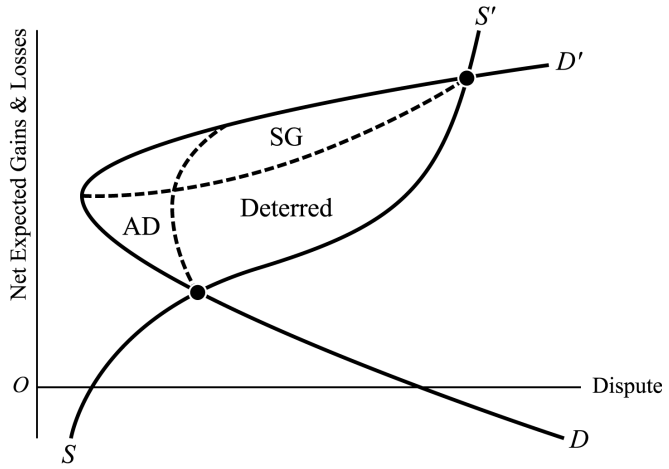


Figure 6: Safeguard and Anti-dumping Measures

error of state of economy is decreasing in the discrepancy from the current state measured by the net gains and losses. In this case, unforeseen contingencies correspond to the states in which their likelihoods are very small but their gains from deviations for the harmed country are very large. An influence of Safeguards is framed by the segment marked by "SG" enclosed by the dashed curve in Figure 6. In this figure, the dashed curve indicating the effect of Safeguards does not necessarily pass through the intersection of the supply and demand functions. This figure suggests Safeguards can compensate for a part of losses in powers of large countries. This argument adds another aspect of Safeguards as a sort of concessions based on reciprocity than as insurance and purge-valve. Note, if powers of two countries are similar, gains and losses from Safeguards Measures are reciprocated and there are no significant gains and losses.

Although the jurisprudence is different, the Anti-dumping Measure (AD) based on Article VI and the Anti-dumping Agreement are applied as an alternative instrument to Safeguards. There are some controversies in AD but now focus on its *de facto* characters. Because AD in WTO does not mention about injuries and contingencies, it makes a leftward shift in the demand function because AD restricts counter measures. Thus, the enclosed area marked by "AD" in Figure 6 represents the influence of AD in the affirmative gains of trade partner. Of course, AD is considered as concessions as in the same sense as Safeguards. However, the crux of the addition of AD to the argument is the expanded concession area (also confirm that two regions "SG" and "AD" are within the "Deterred" region).

The above arguments about Safeguards and AD suggest these remedy measures articulated in GATT function as concessions exchanged between large countries and small countries. It is not necessary to fill whole "Deterred" area by concessions inasmuch as there are still gains for large countries from multilateral and collective negotiations, and special treatments for development purposes (and possibly also ideological gains too). If remedy measures sufficiently compensate net bargaining power losses of large countries, then, conceptually there will arise no claim from large countries except for applications of remedy measures. Note that the recent reluctant attitude of the United States mutes the tone of

WTO-based trade liberalizations and the affiliated members. Thus more are toward regional trade areas allowed by GATT XXIV. It is plausible to seek a reason of the reluctant attitude to the increasing trade deficit of the United States as discussed recently by Agur [1]. However, as another discussion along with the theory of this paper, we can also seek another reason to the insufficient exchanges of "bargaining-power concessions."

TRIPs and GATS are additional rules ratified in the Uruguay Round in 1994. These new agreements are quite different from GATT because TRIPs tends to be trade restricting and GATS deals with trade in services. And these new agreements are mainly promoted by developed countries. But many developing countries had shown oppositions to them. Actually TRIPs mainly protect revenues of developed countries who possess most of intellectual property rights in the world, and GATS requires adjusting domestic business standards eventually to those of developed countries (e.g. Barton et al. [7]). Then, what is their impact especially on our diagram?

By construction, the objective functions of the governments should include all relevant interests. In this sense, issues related to TRIPs and GATS should also has already been included. Then, the locus of the supply function represents the relationship between the net expected gains and dispute cases. Actually, in the long history of negotiations between the United States and Japan, the US Government made lots of requests on business standards in Japan before GATS and outside of the then GATT-framework. Therefore, we can say the supply function is inclusive of relevant interests with intellectual property rights and trade in services and its locus changes at most marginal. Then, insomuch as TRIPs and GATS both impose new restriction rules, the demand function does not shift leftward keeping accordingly reshaped "SG" and "AD" areas in Figure 6. Consequently, the "Deterred" area shrinks by imposing these new agreements.

Furthermore, dispute cases such as regarding to trade in services and intellectual property rights are mainly applied by developed countries. In some sense, victims in violations regarding to these issues have been developed countries. In this sense, taking the developed country as the victim and the developing country as the offender, GATS and TRIPs expand possibility of retaliations and then the demand curves of developed countries shift leftward in our diagram but it means these new rules additionally weaken bargaining power of developing countries (additional concessions). Whence it becomes ambiguous whether the reciprocity rule can justify GATS and TRIPs as in the same way in Antidumping and Safeguards.

Based on the theory of this paper, the fact that developed countries promoted TRIPs and GATS indicates there are insufficient concessions of bargaining power gains from traditional remedy measures. Under the reciprocity rule, these rules and norms are not justified if the concessions from small countries exceed the concessions from large countries. If countries provide excessive concessions, they can leave WTO without any technical restrictions. However, the size of WTO continues to increase: Twenty-five countries have accepted during 1996-2008 and now twenty-nine countries are under review. Therefore, rules providing concessions are justifiable under the reciprocity rule that means concessions are not excessive.

Proposition 5 *Traditional remedy measures (Safeguards and Anti-dumping) can be regarded as instruments to exchange concessions for bargaining-power losses from WTO affiliations. New agreements like TRIPs and GATS also provide additional instruments. These new rules"can be" justified by the reciprocity rule but still ambiguous.*

6 Toward Sustainable Expansion of WTO

Once an international organization loses abilities of providing affiliating members with sufficient benefits, it is destined to be dissolved (e.g. Olson [55]). WTO is not an exception. To the final discussion, based on the comparative advantage of the WTO-DSU, we consider how the WTO can continue to exist. In the history of GATT, the Grandfather clauses had protected privileges of the United States and the United Kingdom. Concerning the earlier era of GATT, these two, especially the United States, were the large countries. In this sense, using the notion of this paper, Grandfather clauses had attempted to avoid unreasonable losses from the "Deterred" area. Actually, the International Trade Organization (ITO) had failed by opposition of the US Congress. The ITO had supposed to have a strong dispute-resolution body in conjunction with the International Court of Justice than GATT without any enforcement institution. That suggests the same problem in the present WTO about conflicts amongst developed countries and developing countries as if the WTO had already existed at the beginning of GATT but it was concealed by the Cold War.

Our arguments have suggested small countries benefit from WTO affiliations insomuch as improvements in bargaining powers and accompanied effective-policy feasibility (Proposition 4) while larger countries ambiguously benefit especially after the end of the Cold War (Proposition 5). If major countries leave the WTO, the benefits for small countries become unavailable and then the WTO will be dissolved. In order to keep reasonable concessions for large countries, despite lots of controversies, traditional remedy measures (Safeguards and Anti-dumping) and new agreements (e.g. TRIPs and GATS) shall be adequately operated especially against small countries. In particular, these rules must conform to respective consensuses: Safeguards and the conclusion of applications of TRIPs to pharmaceutical products are successful cases in this regard. The difficulty of relationships amongst developed countries and developing countries is the exchange of concessions. Now there is no severe ideological struggle and the move of developed countries to seek these additional concessions indicates concessions without new agreements are insufficient. Thus, we need sufficient economic incentives to keep major players in the WTO, which can be done by materializing the requests of developed countries will be indispensable for existence of WTO.

If we need more concessions for large countries as Proposition 5 suggests, in accordance with Proposition 4, we need to reinforce DSU, multilateral benefits, and advisory and educational supports by the Advisory Centre on WTO Law in order to persuade developing countries. Naturally these three objects are correlated. However, reinforcing fairness and transparency of DSU (i.e. dispute panel reports) is more important because successful operations of remedy measures and other agreements inclusive of GATS and TRIPs rely on successful dispute resolutions.

On most parts of this paper, we have excluded trade creations effects of WTO because trade can be promoted without any institutions or by any other institutions such as the OECD (e.g. Rose [63]). However, successful dispute resolution practices under the WTO indicate WTO-affiliation may reduce expected transactions costs of affiliation members since troubles in transactions are resolved more easily than the case without any dispute settlement frameworks—the effect is actually indicated by the leftward shifts of the dispute demand function. If transactions costs are reduced, the affirmative gains from WTO-affiliation contain increased gains from trade to cover additionally the bargaining-power losses of large

countries. Such cost reducing effects of laws are one of the positive reasons of emergence of enforcement laws (e.g. Posner [57]); for example, the existence of the Procedural Guidance of the OECD Guidelines for dispute resolution processes suggests the needs of dispute settlement rules in international trade. Then, we can find a way of resolving conflicts amongst large and small WTO member countries by reinforcing DSU.

When the WTO was inaugurated, its dispute settlement process was also improved and reinforced from the GATT era. This revision of the dispute settlement rule could make its use ease both for developed and developing countries. For example, Busch and Reinhardt [13] estimate the potential probability has increased in the WTO-DSU compared by the GATT-DSP. Yet, the relative change of probabilities seems not obvious. Actually the DSU is still mainly used by developed countries, such as the United States and the European Communities, and major developing countries, such as India and Brazil. And most of countries have never claimed—although we must care whether remaining countries are willing to raise dispute petitions, roughly speaking, fifty-six countries amongst one-hundred and fifty-three members are involved in at least one dispute case as either a complainant or a respondent between January 1995 and August 2009. The network representation of international trade disputes[17] showing these facts is presented at the end of this paper (see also Busch and Reinhardt [13] and Shadikhodjaev [66, pp. 113-6, pp. 187-95]).

On one hand, we may say there are actually fewer potential complaints in developing countries compared by those in developed countries. On the other hand, however, faithfully taking account for the complaints of the developing countries, we may find developing countries suppress potential disputes of the developing countries using tacit threats or the "shadow laws." In our diagram, some parts of the remaining region enclosed by the demand and supply functions are covered by such threats. Ultimately, no area may remain for the developing countries. In such cases, as this paper consistently insists, no affirmative gains from WTO-affiliation is provided for the developing countries and secessions are attempted looking for better associations (e.g. recent BRICs and Mercosur movements). In order to keep the WTO as the international trade forum of the world, therefore, the WTO must keep the affirmative gains for the developing countries, which is indicated by the remaining "Deterred" area in our diagram, and that can be done by reinforcing the dispute settlement rules and practices to reduce the influence of the shadow laws.

Proposition 6 *Reinforcing DSU is a way for the WTO to continue existing and that means it needs to be a dispute settlement institution. In this case, based on the reciprocity, keeping the affirmative gains for the developing countries members must be attempted. Assuredly, it then does not have to deal with disputes caused by agreements irrelevant to the WTO negotiations. Thence, trade liberalization talks within the WTO-framework become viable under the aegis of the strong DSU.*

Finally, consider the expected value of the length until the deviations are identified (τ_0). For example, it is altered by the efficiency of the Appellate Body or the capability of each country to identify deviations. Note, the same argument may apply to the expected length of retaliation (τ) and of remedy measures but they are determined by the dispute panel and negotiations. If disputes can be resolve quickly, the gains and losses respectively for the deviating country and the harmed countries become correspondingly smaller. This thesis is

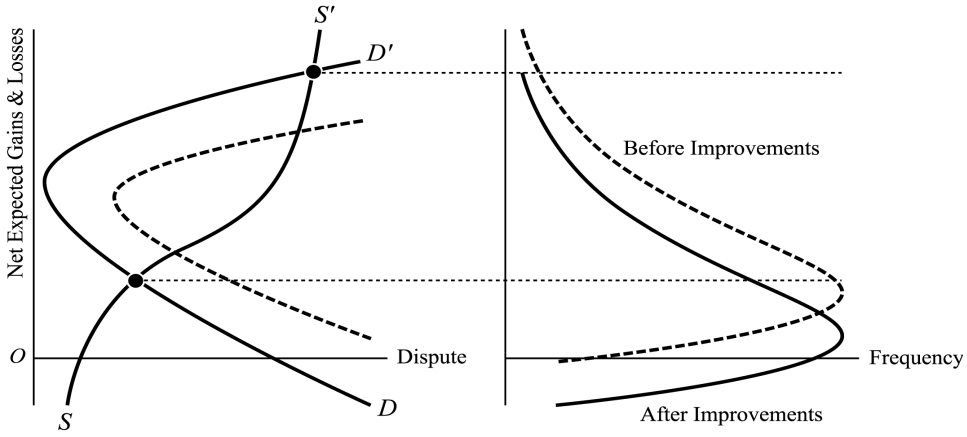


Figure 7: Improvements in the Dispute Settlement Procedures

also consistent with a conclusion in Bütler and Hauser [14] proposing that the improvements in the new DSU of WTO (after DSP of GATT) is the improvements in time between identifying a deviation and implementing settlement rules (if accused country fails) since the delay is one of the sources of incentives of deviations as noted earlier (Section 3). In such a case, demand curve shifts represent improvements in the dispute settlement procedures (e.g. from the GATT-DSP to the WTO-DSU).

In our diagram, as τ_0 becomes shorter, the density function of the state of economy measured by the gains shifts downward as depicted by Figure 7 (right). In this right figure, the dashed curve is the density function before the improvements. However, it suggests there is no guarantee the realizing dispute cases decline. Indeed, dispute cases may increase if the peak of the density function moves around the downward sloping segments of the demand function. Note, because payoffs to both governments are altered by this change, the supply and demand functions may be affected and that reinforces the ambiguity of the outcome of reforming the process. Yet, the declined net expected gains of the deviator improve the policy feasibility of the harmed country under the same cost structure as before the improvements. Then, as in the case of accession to the WTO, the demand function moves leftward and expands both upward and downward as depicted by the dashed curve in Figure 7 (left). Therefore, the improved speed of the dispute settlement understanding unambiguously improves the bargaining power of the harmed country in terms of the dispute supply before the change.

Proposition 7 *Improvements in the speed of dispute identifications reduces expected injuries (and gains) of respective countries and the improved speed enhances the bargaining power of the potentially harmed country. However, these improvements ambiguously reduce the frequencies of disputes.*

7 Conclusion

Using a standard political economy framework with multiple and various markets, this paper has considered supply of and demand for disputes based on the notion of the Market Model of Crime (Ehrlich [25, 27]). We have also built the model based on the notion that trade liberalizations can be promoted by other institutions than the WTO but the comparative advantage of the WTO is its dispute settlement process. Then we have found the dispute supply function is increasing in the net expected gains as the same as the supply of offenses (Propositions 1 and 2). However, by policy-feasibility constraints, we have found the dispute demand function is backward-bending, unlike the usual demand for offenses (Proposition 3). The backward-bending demand function constrained by the policy feasibility also coincides with the observation of Bagwell and Staiger [5]. Applying these supply and demand functions, in order to consider an appropriate criterion for determining the WTO policies, we have considered the reciprocity rule to get the some fundamental results.

For small countries (less bargaining power), WTO-affiliation is beneficial insomuch as improvements in their bargaining-power. And the improvements in the bargaining power are reinforced by DSU, Multilateralism, and advisory and educational programs provided by the WTO (Proposition 4). In contrast, gains from WTO-affiliation for large countries (sufficient bargaining power) are ambiguous and likely negative (Proposition 5). Because other institutions can take part in WTO in trade promotions, or even without any institutions, affirmative gains and losses are from bargaining powers. Under the reciprocity rule, then, it can be justified to apply traditional remedy measures and other new agreements such as GATS (domestic policy restricting) and TRIPs (trade restricting). These agreements are instruments for exchanging concessions for bargaining-power losses of large countries.

Until the end of the Cold War, such instruments for exchanging concessions are not important. One reason is because of small number of developing countries within the GATT framework. The other is the ideological reason to protect developing countries from Communism. However, now we have a large number of developing countries within the WTO and there is no affirmative ideological reason. Thus new agreements as instruments for exchanging concessions are indispensable to compensate for bargaining-power-losses of large countries. In order to implement these agreements, the DSU must be reinforced because fair and transparent operations of agreements depend on fairness and transparency of dispute resolution processes. To do so, keeping the affirmative gains for the developing countries must be attempted while keeping the reciprocal treatment for the developed countries must also be attempted (Proposition 6). Then, we can expect keeping the presence of the WTO as the international trade forum of the world. Though presenting an alternative material legal structure for this solution is beyond the scope of this paper (and my capability), we can say the WTO cannot remain its presence unless it cannot keep providing affirmative gains (hopefully positive gains). Let me remain the material legal solutions for the future studies.

In addition, improvements in the speed of dispute settlement processes ambiguously reduce the realizing dispute cases. However, it unambiguously reduces injuries of each case and also improves the bargaining power of the harmed country (Proposition 7). This result suggests we must be careful about the policy evaluation processes because one might conclude reforms of DSU are incapable of reducing dispute cases and the reforms are ineffective. In addition, if the WTO-affiliation improves the capability of detecting deviations to shorten

the expected length, it reinforces the affirmative gains from the membership. We can also interpret this thesis using the resource allocation logic of Landes [45] and Gould [30]: Players are less careful about insignificant issues and then such "small cases" tend to easily appear.

As a consequence of reinforced DSU, transactions costs of the WTO members will decline. Then, affirmative gains from WTO-affiliation arise from gains from additional trade. These additional gains will be another source of compensating bargaining-power losses of developed countries to keep them in the WTO framework. This result indicates the WTO should develop as a dispute settlement institution for international trade.

For further study, an extension to the model capable of dealing with distributive justice may be important (e.g. apply Ehrlich [26]) and here is another advantage of applying the market model of crime compared by the repeated-game approach. As far as I know, this kind of economic analysis on the world trading system has not been done intensively while one of major problems in the present difficulties in the WTO, especially between developed and developing countries, emanate from feelings of uneven treatments (*ex post* distributive justice) and it is the main focus of recent Jagdish Bhagwati's book [12]. In a recent study, though it is neither an economics paper nor a legal paper, Maffettone [47] discusses distributive justice available in the WTO framework focusing on TRIPs. His main concern is the nonexistence of any alternatives of the WTO and the limits he argues are also consistent with the main concern of Professor Bhagwati.

Despite the difference of the focus and the method, the basic philosophy of this paper is the possible alternative institution of the WTO, which it is the complement of the nonexistence argument, and this paper has concluded dispute settlement procedures are the crux of the WTO system. Then it seems natural and viable to direct an extension toward arguments of justice in international trading system as an extension of the model considered in this paper.

As another possible extension, for example, we can consider liberalizations in financial sectors in conjunction with the GATS. On one hand, liberalizations in real sectors must follow liberalizations in financial sectors. On the other hand, for example, Devereuxa and Lee [20] suggest there is an optimal timing (possibly multiple) for financial liberalization when policies are endogenous. Because developed countries have already opened their financial sectors in a large magnitude, this problem is mainly discussed in developing countries. If the optimal timing and the GATS implementation does not coincide, then, we will observe some conflicts.

Such disagreement in timing imposes some opportunity costs on the liberalizing country. As we have seen in Proposition 5, GATS can be justified if it conforms to the reciprocity rule. Even if it can be theoretically justified, however, feelings of unfairness may arise in developing countries because liberalizations in financial sectors may be considered one-sided. If theoretically the financial liberalization conforms to the reciprocity between developed and developing countries, the claim comes from distributive justice problem. This kind of discord is also mentioned in Bhagwati [12]. Therefore, again, extensive studies in conjunction with distributive justice (especially *ex post* problem) turns out very important to resolve mutual misunderstandings amongst developed and developing countries. Such extensions will be much easier in the market model developed in this paper than other approaches.

Notes

[1]See Bagwell and Staiger [2], Dixit [21], Hungerford [38], Ludema [46], Kovenock and Thursby [44], *etc...*

[2]See Bagwell and Staiger [4] for an attempt to analyze changes in protective attitudes responding to economic fluctuations applying the logic discussed in Rotemberg and Saloner [64]: cooperative behavior is likely supported during recessions expecting larger losses from punishments in booms and *vice versa*.

[3]See Baldwin [6], Corden [19] (politically-augmented social welfare), Grossman and Helpman [35] (menu auctions), Hillman [39] (political-support arguments), and Mayer [51] (voting) for fundamental discussions about welfare measures of this kind. In addition, see Mayer [52] for a discussion of endogenous trade policy instrument choice when there are two political parties.

[4]The easiest way of thinking of this kind of social welfare function guaranteeing appropriate equilibrium is aggregating separated markets derived from separable utility functions. In these models, there are possibilities in which firms interact strategically in multiple separated markets. Such cases are, for example, studied by Bernheim and Whinston [9]. Then it becomes much easier to consider agreements and enforcements in the firm levels in the entire model.

[5]Note, if firms and governments interact strategically, we may consider endogenous timing models that extend the notion about endogenous timing in duopoly firms (see, for example, Gal-Or [28], Dowrick [22] and Hamilton and Slutsky [36] for the classics and Kobayashi and Suehiro [43] for a recent game theoretic assessment). As applications to trade policy issues, for example, Syropoulos [69] examined classic works about optimum tariffs and retaliatory actions, Devereuxa and Lee [20] discussed endogenous timing of international financial policy and trade (see also the concluding discussion, Section 7), and recently Tawada and Supasri [68] discussed preferences over leadership between two countries when there are multiple Cournot firms. These studies are assuredly important to show existence of Nash equilibrium and to characterizations of the equilibrium in varieties of situations involving duopoly firms and governments. However, as we will see, at least for now, the more importance is placed on the existence of Nash equilibrium as a threat point to implement agreements. In this sense, a possibility of delegating trade liberalization (technically by cyclicity) suggested by Matsuyama [53] should be briefly assessed here. In such cases, we consider liberalization itself is an agreement and delegation shall be punished by the agreed implementation rule.

[6]Free trade is conceptually attainable as a consequence of negotiations but as it is proposed by much earlier works by Mayer [50] as well as Johnson [41] and Kennan and Riezman [42], the free-trade conclusion is not necessarily the case (see, for example, Bagwell and Staiger [3, pp. 15-18]).

[7]See Riezman [60] for an application to international trade.

[8]For example, let ω^{∞} be the maximum of the feasible dispute cases of Foreign and Ξ be the deterred disputes. Then, the derived demand for disputes of Home is given by $\Omega^{d} = \omega^{\infty} - \Xi$.

[9]For example, we are talking about the case in which the *government* derives an iso-quant about the expected magnitude of injuries $I \equiv \Omega \times (-\Lambda)$ as a result of optimization on Ξ, where Ξ is as defined previously in Note 8. Of course, I may not be linear if risk attitudes are altered.

[10]See also an analogous argument of Gould [30] in a game played by prosecutors and defenders in court trials and settlements.

[11]See also Kennan and Riezman [42] and Syropoulos [70] on how larger countries win tariff wars

[12]Whence, if it is necessary, some appropriate aggregation of the bargaining power determines the aggregated relative bargaining power of each country (see also Magee and Magee [48]).

[13]Technically the existence of the intersections after the leftward shift is *usually* not necessary for the following argument because we can *usually* compute expected values of affirmative gains from improvements from relative positions even if the "Deterred" area is not closed insomuch as the probability distribution of the state of economy attains infinitesimal values to states that bring extremely large values of deviations gains. If this is not the case, existence of intersections is to be verified but such cases indicate there are too much possibilities of huge deviations gains and the trade agreement itself is defective; thus, we can justify to assume the existence of expected value of the "Deterred" area for cases in which the area is not empty.

[14]In international trade history, Greif [32, 33] and Greif et al. [34] discuss such practices in medieval trade scenes. For example, these traders had shared information about skippers to identify and to deter misdeeds like smuggling. Similar information networks were also formed by medieval Portuguese merchants (Studnicki-Gizbert [67]). The same logic applies to the contemporary international trading system.

[15]Notice, however, the United States will be a large country in an aggregate sense in our present context—see also a discussion by Magee and Magee [48] indicating that even the United States may be a small country in each separated market.

[16]It is a well-know phenomenon in contract theory: Coates and Ludema [17] study unilateral liberalization leadership based on this logic.

[17]This network graph is based on the record of dispute complaints of the WTO (DS1-DS397) and my proceeding research (Saito [65]). The graph shows directed relations of complaints between countries. For example, a directed arrow from US to EC indicates a case in which the United States accused the European Cimmunities: therefore, for further exmaple, five out-going arrows and three in-coming arrows indicate the country accused five times and was accused three times.

References

[1] Agur, Itai. The US trade deficit, the decline of the WTO and the rise of regionalism. *Global Economy Journal*, 8 (3), Article 4, 2008.

[2] Bagwell, Kyle and Robert W. Staiger. An economic theory of GATT. *American Economic Review*, 89 (1), 215-48, 1999.

[3] Bagwell, Kyle and Robert W. Staiger. *The Economics of the World Trading System*. Cambridge, MA: MIT Press, 2002.

[4] Bagwell, Kyle and Robert Staiger. Protection and the business cycle. *The B.E. Journal of Economic Analysis and Policy*, 3 (1), Article 3, 2003.

[5] Bagwell, Kyle and Robert W. Staiger. What do trade negotiations negotiate about? Empirical evidence from the World Trade Organization. *NBER Working Paper*, No. 12727, 2006.

[6] Baldwin, Richard E., Multilateralising regionalism: Spaghetti bowls as building blocs on the path to global free trade, *World Economy* 29 (11), 1451-1518, 2006.

[7] Barton, John H., Goldstein, Judith L., Josling, Timothy E., and Richard H. Steinberg. *The Evolution of the Trade Regime: Politics, Law, and Economics of the GATT and WTO*. Princeton, NJ: Princeton University Press, 2006.

[8] Becker, Gary S. Crime and punishment: An economic approach. *Journal of Political Economy*, 76 (2), 169-217, 1968.

[9] Bernheim, B. Douglas and Michael D. Whinston. Menu auctions, resource allocation, and economic influence. *Quarterly Journal of Economics*, 101 (1), 1-31, 1986.

[10] Bernheim, B. Douglas and Michael D. Whinston. Multimarket contact and collusive behavior. *RAND Journal of Economics*, 21 (1), 1-29, 1990.

[11] Bhagwati, Jagdish. Regionalism and multilateralism: An overview. In *Trading Blocs: Alternative Approaches to Analyzing Preferential Trade Agreements*, ed. Jagdish Bhagwati, Pravin Krishna, and Arvind Panahariya, 3-32. Cambridge, MA: MIT Press, 1999.

[12] Bhagwati, Jagdish. *In Defense of Globalization (With a New Afterword by the Author).* New York, NY: Oxford University Press, 2007.

[13] Busch, Marc L. and Eric Reinhardt. Developing countries and General Agreement on Tariffs and Trade/World Trade Organization dispute settlement. *Journal of World Trade*, 37 (4), 719-35, 2003.

[14] Bütler, Monika and Heinz Hauser. The WTO dispute settlement system: A first assessment from an economic perspective. *Journal of Law, Economics and Organization*, 16 (2), 503-33, 2000.

[15] Chang, Winston W. Antidumping, countervailing, and safeguard measures. *GITAM Review of International Business*, 1 (1), 1-34, 2009.

[16] Chang, Winston W. Trade disputes in practice. *Vigna Vahini Journal of Management*, forthcoming.

[17] Coates, Daniel E. and Rodney D. Ludema. A theory of trade policy leadership. *Journal of Development Economics,* 65 (1), 1-29, 2001.

[18] Coates, Dennis, Heckelman, Jac C., and Bonnie Wilson. Democracy and volatility: Do special-interest groups matter? *Unpublished manuscript* (Conference Paper for the 84th Annual Meeting of the Western Economic Association), June 2009.

[19] Corden, W. Max. *Trade Policy and Economic Welfare.* New York, NY: Oxford University Press, 1997.

[20] Devereux, Michael B. and Khang Min Lee. Endogenous trade policy and the gains from international financial markets. *Journal of Monetary Economics*, 43 (1), 35-59, 1999.

[21] Dixit, Avinash K. Strategic aspects of trade policy. In ed. Truman Bewley (Ed.) *Advances in Economic Theory: Fifth World Congress*, Cambridge, UK:Cambridge University Press, 1987, pp. 329-362.

[22] Dowrick, Steve. Von Stackelberg and Cournot duopoly: Choosing roles. *Rand journal of Economics*, 17 (2), 251-60, 1986.

[23] Ethier, Wilfred J. Regionalism in a multilateral world. *Journal of Political Economy*, 106 (6), 1214-45.

[24] Ethier, Wilfred J. Unilateralism in a multilateral world. *Economic Journal*, 112 (479), 166-92, 2002.

[25] Ehrlich, Isaac. On the usefulness of controlling individuals: An analysis of rehabilitation, incapacitation and deterrence. *American Economic Review*, 71 (3), 307-22, 1981.

[26] Ehrlich, Isaac. The optimum enforcement of laws and the concept of justice: A positive analysis. *International Review of Law and Economics*, 2 (1), 3-27, 1982.

[27] Ehrlich, Isaac. Crime, punishment, and the market for offenses. *Journal of Economic Perspectives*, 10 (1), 43-67, 1996.

[28] Gal-Or, Esther. First mover and second mover advantage. *International Economic Review*, 26 (3), 649-53, 1985.

[29] Goldberg, Pinelopi K. and Giovanni Maggi. Protection for sale: An empirical investigation. *American Economic Review*, 89 (5), 1135-55, 1999.

[30] Gould, John P. The economics of legal conflicts. *Journal of Legal Studies*, 2 (2), 279-300, 1973.

[31] Green, Edward J. and Robert H. Porter. Noncooperative collusion under imperfect price information. *Econometrica*, 52 (1), 87-100, 1984.

[32] Greif, Avner. Reputation and coalitions in medieval trade: Evidence on the Maghribi traders. *Journal of Economic History*, 49 (4), 857-82, 1989.

[33] Greif, Avner. *Institutions and the Path to the Modern Economy*. New York, NY: Cambridge University Press, 2006.

[34] Greif, Avner, Milgrom Paul, and Barry R. Weingast. Coordination, commitment, and enforcement: The case of the merchant guild. *Journal of Political Economy*, 102 (4), 745-776, 1994.

[35] Grossman, Gene M. and Elhanan Helpman. Protection for sale. *American Economic Review*, 84 (4), 833-50, 1994.

[36] Hamilton, Jonathan H. and Steven M. Slutsky. Endogenous timing in duopoly games: Stackelberg or Cournot equilibria. *Games and Economic Behavior*, 2 (1), 29-46, 1990.

[37] Helpman, Elhanan and Paul R. Krugman. *Trade Policy and Market Structure*. Cambridge, MA: MIT Press, 1989.

[38] Hungerford, Thoman, L. GATT: A cooperative equilibrium in a noncooperative trading regime? *Journal of International Economics*, 31 (3-4), 357-69, 1991.

[39] Hillman, Arye L. Declining industries and political-support protectionist motives. *American Economic Review*, 72 (5), 1180-87, 1982.

[40] Jackson, John H. *The World Trading System: Law and Policy of International Economic Relations*, Second Edition. Cambridge, MA: MIT Press, 1997.

[41] Johnson, Harry G. Optimum tariffs and retaliation. *Review of Economic Studies*, 21 (2), 142-53, 1953-54.

[42] Kennan, John and Raymond Riezman. Do big countries win tariff wars? *International Economic Review*, 29 (1), 81-5, 1988.

[43] Kobayashi, Hajime and Hideo Suehiro. Leadership by confidence in teams. *Graduate School of Business Administration, Kobe University, Discussion Paper*, No. 2008-35, 2008.

[44] Kovenock, Dan and Marie Thursby. GATT, dispute settlement and cooperation. *Economics and Politics*, 4 (2), 151-70, 1992.

[45] Landes, William M. An economic analysis of the courts. *Journal of Law and Economics*, 14 (1), 61-107, 1971.

[46] Ludema, Rodney. Optimal international trade agreements and dispute settlement procedures. *European Journal of Political Economy*, 72 (2), 355-76, 2001.

[47] Maffettone, Pietro. The WTO and the limits of distributive justice. *Philosophy and Social Criticism*, 35 (3), 243-67, 2009.

[48] Magee, Christopher S. P. and Stephen P. Magee. The United States is a small country in world trade. *Review of International Economics*, 16 (5), 990-1004, 2008.

[49] Maggi, Giovanni. The role of multilateral institutions in international trade cooperation. *American Economic Review*, 89 (1), 190-214, 1999.

[50] Mayer, Wolfgang. Theoretical considerations on negotiated tariff adjustments. *Oxford Economic Papers*, 33 (1), 135-53, 1981.

[51] Mayer, Wolfgang. Endogenous tariff formation. *American Economic Review*, 74 (5), 970-85, 1984.

[52] Mayer, Wolfgang. Trade policy platforms of competing parties: What makes them different? *Review of International Economics*, 6 (2), 185-203, 1998.

[53] Matsuyama, Kiminori. Perfect equilibria in a trade liberalization game. *American Economic Review*, 80 (3), 480-92, 1990.

[54] McMillan, John. The Economics of Section 301: A game-theoretic guide. *Economics and Politics*, 2 (1), 45-57, 1990.

[55] Olson, Mancur. *The Logic of Collective Action: Public Goods and the Theory of Groups.* Cambridge, MA: Harvard University Press, 1971.

[56] Porter, Robert H. Optimal cartel trigger-price strategies. *Journal of Economic Theory*, 29 (2), 313-38, 1983.

[57] Posner, Richard A. Social norms and the law: An economics approach. *American Economic Review*, 87 (2), 365-69, 1997.

[58] Radner, Roy. Repeated principal-agent games with discounting. *Econometrica*, 53 (5), 1173-98, 1985.

[59] Riezman, Raymond. Tariff retaliation from a strategic viewpoint. *Southern Economic Journal*, 48 (3), 583-93, 1982.

[60] Riezman, Raymond. Dynamic tariffs with asymmetric information. *Journal of International Economics*, 30 (3-4), 267-83, 1991.

[61] Rose, Andrew K. Do we really know that the WTO increases trade? *American Economic Review*, 94 (1), 98-114, 2004.

[62] Rose, Andrew K. Do WTO members have more liberal trade policy? *Journal of International Economics*, 63 (2), 209-35, 2004.

[63] Rose, Andrew K. Which international institutions promote international trade? *Review of International Economics*, 13 (4), 682-98, 2005.

[64] Rotemberg, Julio J. and Garth Saloner. A supergame-theoretic model of price wars during booms. *American Economic Review*, 76 (3), 390-407, 1986.

[65] Saito, Tetsuya. A network analysis of international trade disputes in the World Trade Organization—January 10, 1995-July 31, 2009. In progress. August, 2009.

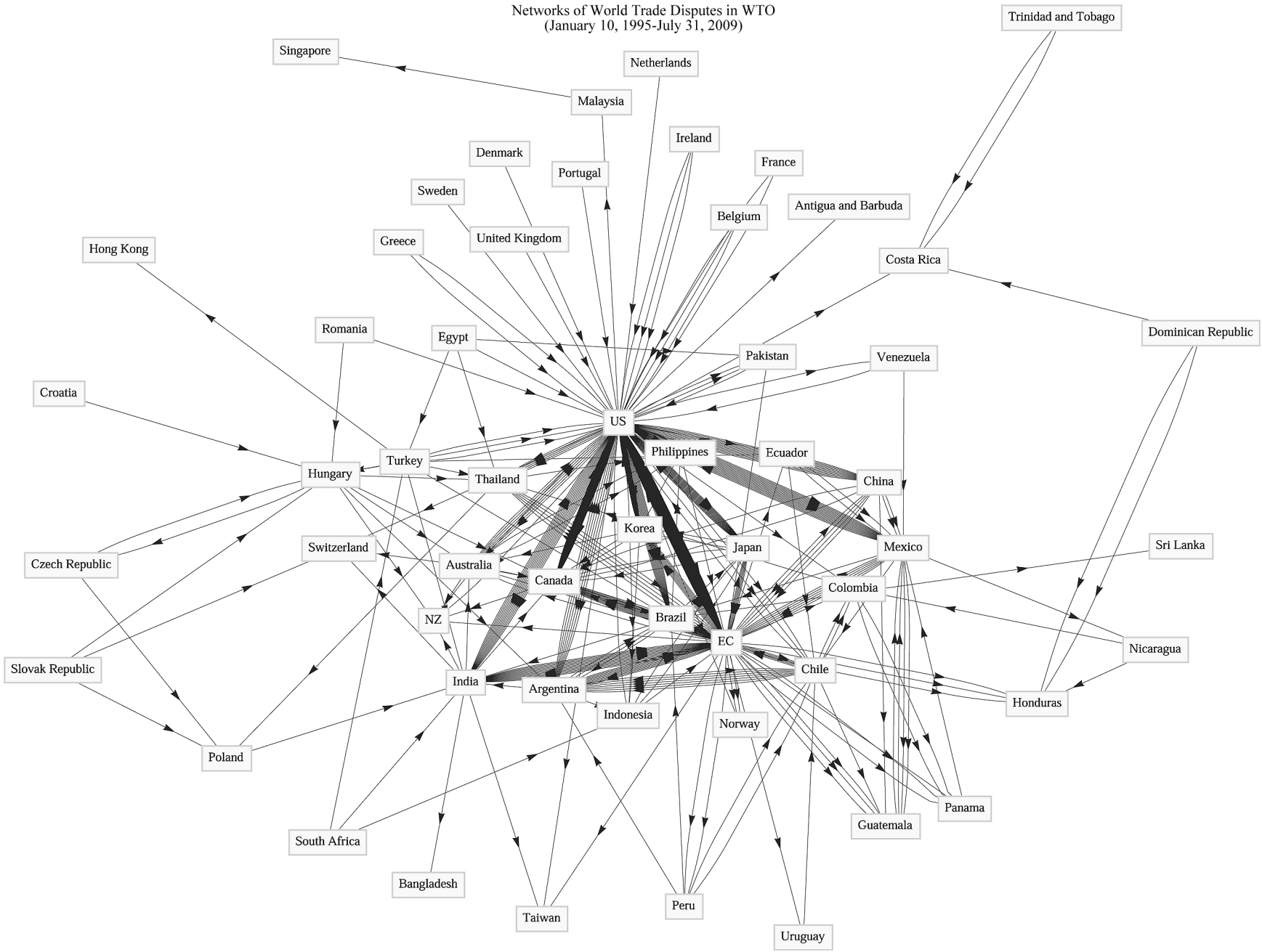
[66] Shadikhodjaev, Sherzod. *Retaliation in the WTO Dispute Settlement System*. Alphen aan den Rijin, Netherlands: Kluwer Law International, 2009.

[67] Studnicki-Gizbert, Daviken. *A Nation Upon the Ocean Sea: Portugal's Atlantic Diaspora and the Crisis of the Spanish Empire, 1942-1640*. New York, NY: Oxford University Press, 2007.

[68] Supasri, Yording and Makoto Tawada. Endogenous timing in a strategic trade policy game: A two country oligopoly model with multiple firms. *Review of Development Economics*, 11 (2), 275-90, 2007.

[69] Syropoulos, Constantinos. Endogenous timing in games of commercial policy. *Canadian Journal of Economics*, 62 (252), 633-48, 1996.

[70] Syropoulos, Constantinos. Optimum tariffs and retaliation revisited: How country size matters. *Review of Economic Studies*, 69 (3), 707-27, 2002.


Networks of World Trade Disputes in WTO
(January 10, 1995-July 31, 2009)
Trinidad and Tobago
Singapore
Netherlands
Malaysia
Ireland
Denmark
Portugal
France
Sweden
Belgium
Antigua and Barbuda
United Kingdom
Greece
Hong Kong
Costa Rica
Dominican Republic
Romania
Egypt
Pakistan
Venezuela
Croatia
US
Philippines
Ecuador
Turkey
Hungary
Thailand
China
Korea
Switzerland
Japan
Mexico
Sri Lanka
Czech Republic
Australia
Canada
Colombia
NZ
Brazil
EC
Nicaragua
Slovak Republic
India
Chile
Argentina
Honduras
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Norway
Poland
Panama
Guatemala
South Africa
Bangladesh
Peru
Taiwan
Uruguay