The Political and Economic Determinants of Trade Disputes under the WTO

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Abstract

This study developed a conceptual analysis based on an asymmetric deterrence game with incomplete information to analyze how trade disputes arise between a given pair of WTO members. We found that the probability of trade dispute is an increasing function of the level of subsidies curtailments sought by the challenger. We hypothesized the challenger's demand is determined by the political and economic profiles of the countries involved. An empirical investigation of the roles of these political and economic variables yielded mixed results, highlighting, in some cases, the preeminence of political or economic heterogeneity within dyads and, in other, that of homogeneity. These findings were attributed to the shifting paradigm in international trade with the emergence of economic powers such as China, India, Korea, and Brazil, to name a few, with political and economic profiles different from those of traditional major players such as the United States, the European Union, and Japan.

Introduction

The World Trade Organization (WTO) emerged as an international organization following the Uruguay Round trade negotiations in 1995. Like its predecessor, the General Agreement on Tariffs and Trade (GATT), this multilateral trade regime was founded to provide a new forum for countries to cooperate and coordinate policies on a variety of trade issues and to promote free trade between countries. Both the GATT and the WTO as institutions have created norms or standards of behavior and set up rules and procedures concerning global trade between nations. These institutions would become increasingly important as national economies became more intertwined through globalization.

Under the GATT's general principles include most-favored nation (MFN) status to all participating countries as well as lowering tariffs for a variety of goods and later regulating non-tariff barriers. Dispute settlement was also built on the concept of reciprocity, that all member countries benefit from agreed trade concessions and there were specific rules over items such as safeguards measures that were put into place to prevent trade policies in one country from causing economic harm to another country (Hoekman and Koesteki 2001).

While trade has increased considerably over the years, one cannot state that nations have always been able to cooperate and coordinate their policies as disputes still emerge over a variety of trade issues, including subsidies to production and exports. By encouraging and promoting the idea of free trade, the WTO offers an opportunity for states to deal with their disputes in a peaceful manner and by some accounts, it could be argued that both institutions have been successful at regulating and fostering cooperation between trading entities. Trade volume and membership count have increased over time and traded goods more diversified. There are 150 nation-states who are members of the WTO as of January 2007 (WTO, 2007). There have been

over 329 trade disputes under the WTO regime in its first decade from 1995 to 2005, almost as many as under GATT during its entire existence. With these statistics, one would wonder if this is an indication that member states are unable to cooperate over trade issues; or is it, as liberal institutionalists would argue, a sign of success because the WTO and its dispute settlement process allows countries to settle disputes in a peaceful fashion as countries become more confident in the ability of the institution to resolve their disputes (Busch and Reinhardt 2002; Keohane 1984). It is important to evaluate which factors have played a role in the dispute process within the WTO. This study, therefore, seeks to analyze both conceptually and empirically what determines the probability that a given pair of WTO members will have a formal WTO dispute. The conceptual analysis is a departure from previous studies, especially in the political science literature, which have merely focused on the empirical side.

Two sets of literature have attempted to explain the determinants of trade disputes. One set emphasizes the importance of economic factors and the other places greater emphasis on the role of political factors as the primary determinants of trade disputes initiations and outcomes (Busch 2000; Busch and Reinhardt 2002; Reinhardt 1999; Sherman 2001). Economic factors have played important roles in trade disputes. These factors include: the level of trade dependency between countries, trade openness, value of exports, level of employment in each sector, and international competitiveness (Cohen 1990; Krueger 1996; Busch 1999; McGillivray et al. 2001; Gawande and Krishna 2003). While these studies highlight several economic factors as determinants of trade disputes, they slight the significance of political factors. For the most part, the economics literature ignores the role of the state and the way domestic political institutions may play an important role throughout the dispute settlement process.

The political science literature has highlighted the role domestic political factors play in the outcomes of international conflicts (Putnam 1988; Fearon 1994; Goldstein 1996; Milner 1997). The democratic peace literature has underscored the role of domestic factors such as regime types in international conflicts. Many studies have observed that democracies were more likely to initiate conflicts and more likely to resolve conflicts in a peaceful manner. Other scholars have noted that non-democratic states and mixed dyads (a mixture of democratic and non democratic states) have a greater tendency to become involved in international disputes (Maoz and Abdolai 1989; Russett 1993; Dixon 1994; Ray 1995; Chan 1997; Maoz 1998; Reiter and Stam 1998; Russett and O'Neal 2001; Huth and Allee 2002). While this may be the case in military conflicts, there is no reason to believe that it is so in trade disputes. In fact, one would argue that trade conflicts are more likely to breakout between two democracies, considering that under a democratic system of government politicians are sanctioned or rewarded through the electoral process based on how well they represent the interest of their constituents or citizens. In that sense, some scholars have argued for greater attention on how different regime types have emerged and the type of trading relationships that exist between democratic countries as alternative explanations for the democratic peace (Chan 1997; Maoz 1998; Rasler and Thompson 2003, 2005; Zeng 2002, 2004).

We develop a conceptual analysis of interstate trade dispute to help shed light into the roles of economic and political factors on trade disputes. The conceptual analysis is the foundation of the modeling structure used in this study. The proposed model identifies and separates the impact of institutional differences on the trade dispute process. It also captures the variation in the types of democracies, economic and electoral factors at the monadic and dyadic level.

Conceptual Analysis and Model Derivation

We illustrate our conceptual analysis of inter-state trade disputes by assuming a cost-competitive country i and a less cost-competitive country j, both producing the same commodity. Let us further assume that the two countries have a net surplus of the commodity, which they seek to dispense in the world market. Both countries have specific profiles such as economic strength, system of government, trade openness, and political climates. These variables determine to various degrees how these two countries conduct their affairs at the domestic and international stages. Considering country i seeks to maximize a social welfare function $w_i(u_i, v_i)$ with the utility u_i a function of export earnings e_i and v_i representing the utility drawn from the other sectors of its economy. Likewise, considering country j seeks to maximize a social welfare function $w_j(u_j, v_j)$ with the utility u_j a function of exports e_j. The social welfare function of country i is an increasing function of export earnings. More formally, we can write $u_i = \phi(e_i)$, $\partial u_i / \partial e_i > 0$, and $\partial w_i / \partial e_i > 0$. Country j is net exporter of the commodity because of the production and export subsidies allocated to producers and exporters of the traded commodity. Thus, the social welfare function of country j is an increasing function of e_j, which in turn is an increasing function of production subsidies s_j. Formally, $u_j = \phi(e_j)$, $\partial u_j / \partial e_j > 0$, and $\partial w_j / \partial e_j > 0$. The rise in exports by country j induces a welfare loss in country i on two fronts: a decline in world price of the traded commodity as well as a potential loss of market share as a result of these subsidies. Thus, export earnings in country i are a decreasing function of level of support s_j in country j; hence are harmful to the welfare of producers in country i. We can formally write, , $\partial e_i / \partial s_j < 0$, $\partial e_j / \partial s_j > 0$, $\partial w_i / \partial s_j < 0$, and $\partial w_j / \partial s_j > 0$.

We applied a simple analytic based on the concept of asymmetric deterrence game with incomplete information (Zagare and Kilgour, 2000) to the situation described above to further our understanding of how inter-state trade disputes arise. Under the framework, the entity with incomplete information makes a decision to challenge the *status quo* based on the expected payoff of the challenge, its beliefs of how the defendant would respond to the challenge, and the cost of the challenge. The defendant responds to the challenge solely based on its evaluation of the expected benefit of maintaining the *status quo* and the cost of litigation. Reed (2003) and Grinols and Perrelli (2006) used similar approach in their respective studies. Reed study analyzed the role of power parity and information asymmetries in enhancing uncertainty in international politics and the likelihood of inter-states conflicts. Grinols and Perrelli devised a simple litigation game to analyze the duration of trade dispute. In our study, we consider the context in which country i (i.e., the challenger) facing the above-described circumstances to either accept the *status quo* situation with a utility of export earning $\phi_1(e_i)$ or challenge country j (i.e., the defendant) to cut its level of production subsidies on the basis that they are harmful to its economy and the welfare of its producers. The challenger would issue a formal demand to the defendant if its expected utility under this scenario is greater than that under the *status quo* situation and the defendant will not yield to the challenger's demand if its expected benefit from fighting ($p_j \times b_j$) exceeds the total level of support (s_j) less the cost to fight the challenge (c_j). The cost of challenge includes cost of litigation and retaliation by the challenger.

Assuming as in Reed that the probability p_j at the basis of the decision to yield or fight the challenge has a density $f(\cdot)$ and cumulative distribution $F(\cdot)$, then the probability that the defendant would yield to the challenger's demand can be explicitly written as

$1 - F\left[(s_j - c_j)/b_j\right]$. A von Neumann-Morgenstern representation of the challenger's expected utility function of export earnings may be formally stated as follows

$$EU_i\left(s_j\right) = [1 - F(\cdot)]\phi_2\left(e_i\right) + [F(\cdot)]\phi_3\left(e_i\right). \qquad (1)$$

This component $\phi_2\left(e_i\right)$ of the expected utility function is the pay-off for the challenger if the defendant yields to its demand and the component $\phi_3\left(e_i\right)$ is the payoff if the defendant faces off the challenger. These two components are respectively weighted by the probability of the defendant yielding to the demand and the probability of facing the challenge. Furthermore, the utility $\phi_3\left(e_i\right)$ is itself an expected utility that involves the payoff for the challenger if it wins and the payoff if it loses with weighting probabilities independent of s_j. The challenger's preference may be ranked as follows: $\phi_2\left(e_i\right) > \phi_3\left(e_i\right) > \phi_1\left(e_i\right)$. Assuming the challenger's threats are credible, the two countries would likely enter a dispute process if the defendant does not yield to the demand. The challenger believes it would win any arbitration, which is the reason to issue the demand in the first place. The function $\phi_2\left(e_i\right)$ is assumed dependent of s_j though to a lesser extent. The first order condition of the utility maximization process is derived from the partial derivative with respect to the control variable s_j of the challenger expected utility of export earnings. Thus,

$$\partial EU\left(s_j\right)/\partial s_j = f(\cdot)[\phi_3\left(e_i\right) - \phi_2\left(e_i\right)]/b_j + [1 - F(\cdot)]\partial \phi_2\left(e_i\right)/\partial s_j. \qquad (2)$$

The first component of the utility maximization process is the expected marginal gain from the support curtailments scenario and the second is the marginal loss incurred by the challenger because of a marginal increase in production subsidies by the defendant. Setting the first order condition to zero yields the following relationship

$$f(\cdot)/1-F(\cdot)=[-b_j \times \partial \phi_2(e_i)/\partial s_j] \times [\phi_3(e_i)-\phi_2(e_i)]^{-1}. \qquad (3)$$

The left hand side of the equality is the hazard rate function $h(\cdot)$ defined as the probability of trade dispute occurring at time period "t" given that it has not occurred prior to that time period. It is conditional on the information set at time "t-1", which includes the already defined country characteristics. Thus, an increase of s_j raises the probability of trade conflict between the two countries. The hazard rate is greater than zero as long as the negotiated outcome remains dependent on some level of subsidies by country j and converges to zero if the negotiated outcome results in the elimination of the contested subsidies; that is $\partial \phi_2(e_i)/\partial s_j = 0$.

The optimal level of subsidies $\overline{s}_j$ to challenge without compromising the possibility of reaching a negotiated outcome can be derived by solving the first order condition of the expected utility maximization for s_j. However, one could also argue that there is always a positive probability of conflict because the challenger would likely overplay its hands by seeking deeper cuts in subsidies because of the information asymmetry between the contending countries leads a challenger to misjudge how much of its demand a targeted defendant is willing to accept. The probability of conflict is found by solving equation (3) for $F(\cdot)$. It is a function of s_j, thus, conditional on specific countries' characteristics as previously stated..

Estimation Procedures and Data

The determining role of political and economic factors on trade disputes was illustrated in the conceptual analysis. The analysis shows the importance of the challengers' and defendants' specific and relative characteristics that need to be accounted for in an inter-sate trade dispute model. In this section, we propose a binary choice model based on the conceptual analysis,

which provides a framework to estimate the probability of trade disputes between a challenger

and a defendant while accounting for the heterogeneity between the two states. More formally,

let $s_{k,t}$ the level of contested subsidies within the kth dyad (i.e., challenger and defendant) at time

"t" be a latent variable and $d_{k,t}$ a binary choice variable equal to one if a trade dispute breaks out

for a given dyad and zero otherwise. Following Wooldridge (2001) we define the binary choice

model with serially correlated error as follows

$$s_{k,t} = \mathbf{x}'_{\mathbf{k,t}}\boldsymbol{\beta} + \varepsilon_{k,t}, \ d_k = 1 \text{ if } s_{k,t} > \overline{s}_{j,t} \text{ and 0 otherwise, } \varepsilon_{k,t} = \rho\varepsilon_{k,t-1} + \mu_{k,t}, \text{ and } \mu \sim N(0,1) \quad (4)$$

Where $\overline{s}_{j,t}$ is a the same as $\overline{s}_j$ defined in the conceptual analysis (the optimal level of subsidies

that can be contested without jeopardizing the possibility of reaching a negotiated outcome) and

$\mathbf{x}_{\mathbf{k,t}}$ is a vector of explanatory variables that characterize the challenger and the defendant

and $\boldsymbol{\beta}$ the vector of their respective coefficients, $\varepsilon_{k,t}$ is a stochastic error component with an

autoregressive of order one structure. From the above relationship, we can derive

$\Pr\left[d_{k,t} = 1 \mid \mathbf{x}_{\mathbf{k,t}}\right] = F\left(\mathbf{x}'_{\mathbf{k,t}}\boldsymbol{\beta}\right)$ where $F\left(\mathbf{x}'_{\mathbf{k,t}}\boldsymbol{\beta}\right)$ is the cumulative distribution function. The

cumulative distribution function is based on the probability density function of a trade dispute

breaking out conditional on the specific characteristics of the countries involved, whether as

challengers or defendants, in a monadic sense and how they relate to each other within a dyad.

The estimation is conducted by maximum likelihood with the partial likelihood function defined

as follows

$$L_k(\boldsymbol{\beta}) = \sum_{t=1}^{T} \{d_{k,t} \log F\left[\mathbf{x}'_{\mathbf{k,t}}\boldsymbol{\beta}\right] + \left(1 - d_{k,t}\right)\log\left[1 - F\left(\mathbf{x}'_{\mathbf{k,t}}\boldsymbol{\beta}\right)\right]\}. \qquad (5)$$

Because the maximum likelihood is conditional on the nature of the explanatory variables used,

its validity depends on whether the vector $\mathbf{x}_{\mathbf{k,t}}$ contains exogenous variables, lagged of

exogenous and endogenous variables. The maximum likelihood estimator is found by summing

up the $L_k(\boldsymbol{\beta})$ across all k. This yields consistent parameter estimates, including under instances

of serially correlated errors (Wooldridge, 2001). Moreover, the efficiency of the parameter

estimates is enhanced by using the Huber (1967) "sandwich" variance-covariance estimator to

yield robust standard errors for the parameter estimates. The marginal effects of challengers and

defendants' characteristics on the probability of trade disputes are derived as

$$\partial F\left(\mathbf{x}'_{k,t}\boldsymbol{\beta}\right)/\partial x_i = \beta_i f\left(\mathbf{x}'_{k,t}\boldsymbol{\beta}\right), k=(i,j) \text{ and } i \neq j . \qquad (6)$$

The data used in this study included trade disputes between 1995 and 2005 compiled by

the WTO and available on its website. In the original dataset, countries involved in trade

disputes were classified as challengers or defendants. The retrieved information was used to

build 1571 dyad-years comprised of 145 dyads observed between 1995 and 2005. While the

time span was shorter for countries that joined the WTO after 1995, there were no gaps in the

years. The data also include additional information pertaining to political and economic factors

collected from various sources and used as control variables. The variables are described as

follows:

System of Government. This variable comprises four categories, a *Presidential System* in which

the executive branch of government is headed by a president who exercises greater power in the

political system; a *Semi-Presidential* system in which both the president and the prime minister,

which may or may not be from the same political party, play key roles in running the

government; a *Parliamentary System* in which the legislative branch is the main branch of

government and nominates the prime minister who runs the government; a *Communist System* in

which a single party has control over the state such as China. In this study, communism is

analyzed as a system of government rather than an economic system. Based on the literature, it

is expected that states with presidential systems will be more inclined to free trade and are expected to be more likely to initiate disputes as well as more likely to be targeted for disputes (Milner 1988; Lohmann and O'Halloran 1994; Huth and Allee 2002; McGillivray 2004).

Stage of Democratization. This variable is often referred to as regime type in the literature and it is constructed using the Polity IV data through 2004 (Marshall, Jaggers and Gurr)**.** The polity score measures the level of democracy in each country with a higher score indicating a higher level of democratization. We used the polity score to construct three stages of democratization for each challenger and defendant. The stages of democratization in this study are: *Mature Democracies*, *Emerging Democracies*, and *Non-Democracies*. The first category comprises countries which have a Polity score higher than 8 with 10 being the highest; the second category comprises countries which have a Polity score ranging from 6 and 8 (included); and the last category includes countries with a Polity score below 6 (included).

Income Strata. This variable illustrates the classification of various challengers and defendants based on their per capita gross domestic products. The categories are: *Middle and Low Income* countries, which include among others large trading countries such as China and India, *High Income Non-OECD,* which include small countries such as Singapore, and *High Income OECD* such as the United States. We refer to the first category as middle income from this point forward.

Election Cycle. This variable indicates whether an election was held during the year a trade dispute was initiated. The election variable is used to test the effect of elections on trade disputes. It is expected that elections will have a positive impact on the probability to initiate trade disputes.

Gross Domestic Product. This is a logarithm of the real gross domestic product (GDP) variable, which was retrieved from the Center of International Comparison at the University of Pennsylvania (2007). The gross domestic product variable is expected to have a positive impact on the likelihood of a country to initiate a trade dispute.

Trade. This is an index that measures the ratio of total imports and exports as a percentage of GDP. It is an indicator of the degree of openness of an economy and is expected to have a negative and significant impact on trade disputes. The data for this economic variable were also retrieved from Penn World Table website Center of International Comparison at the University of Pennsylvania (2007). For the European Union, the index is calculated as the weighted average of the trade index of all member countries.

The described variables are used to construct homogeneous and heterogeneous dyads using various combinations of political and economic strata of challengers and defendants used as explanatory variables dummy variables. A dummy variable *Europe* was also introduced for the defendant to control for the fact that member countries generally file complaint through the organization but may be targeted individually by other countries.

Descriptive Results

A preliminary analysis of the data in Table 1 indicates there were 260 disputes out of 1,571 dyad-years, which corresponds to 16.55% of the total sample. With respect to the distribution of various countries' characteristics within the overall sample, the results show a slight difference in terms of the relative proportion of the different political systems based on whether the countries are challengers or defendants. As Table 1 indicates, 53.79% of the challengers versus 47.74% of the defendants had a presidential system of government, 43.09%

versus 44.18% a parliamentary system, and 2.80% versus 7.77% a semi-presidential system. A further decomposition of the distribution of countries' system of government in relation to their involvement in trade disputes whether as challengers or defendants showed a significant deviation between presidential system (2.70%) versus parliamentary system (-2.93%). Thus, countries with presidential system were more likely to be involved in trade disputes as challengers than countries with parliamentary system.

Table 1 indicates 65.63% of all challengers in the sample were mature democracies versus 60.15% of all defendants. Meanwhile, 29.34% of all challengers were emerging democracies versus 32.02% of all defendants and 5.03% of all challengers versus 7.83% of all defendants were non-democracies. Looking at countries' income strata, the preliminary analysis of the data in Table 1 indicates that 51.37% of all challengers in the overall sample were middle income countries versus 59.90% of all defendants. Further, 47.93% of all challengers were high income OECD countries versus 40.10% of all defendants.

Table 2 shows that the distribution of involvement in trade disputes as challengers or as defendants varies according to the level of democratization. Mature democracies were 2.31% more likely to be challengers than defendants. On average, over 70% of disputes occurred between mature democracies. In contrast, 25% of disputes were among emerging democracies; however, these countries were more likely to be defendants. Less than 5% of disputes were among non-democracies and they were equally likely to be defendants or challengers. Thus, mature democracies were more likely to be involved in trade disputes as challengers while the emerging democracies were more likely to be involved as defendants.

The distribution of dispute involvement across income strata (Table 2) shows that middle income countries were more likely to be involved in trade disputes as defendants while high

income OECD countries were more likely to be involved as challengers. The high income non-OECD countries were involved in trade disputes solely as challengers. There were significant differences in countries' involvement in trade disputes as challengers or defendants based on their per capita income. This was indicated by the positive gap (4.84%) for high income countries and the negative gap (-4.85%) for the middle and low income countries. As for the electoral cycle, countries were more likely to be involved in trade disputes as challengers when there was no election and as defendants during election years. However, these differences were relatively minimal.

<div align="center">**Estimation Results**</div>

The results are based on an estimated dyadic panel probit model with serially correlated errors that follow an autoregressive process of order one. The marginal effects are derived at the means and the standard errors are corrected for heteroskedasticity and clustering of errors at the dyad level. All the variables specified in the panel probit model and the estimation results are presented in Table 3.

There was a significant difference between dyads with homogeneous versus heterogeneous systems of government and their effect on trade disputes. Homogeneous dyads exist when both the challenger and defendant have a parliamentary or a semi-presidential system of government while heterogeneity refers to the situation where the challenger's system of government is a presidential system and the defendant is a semi-presidential system. The results show the likelihood of trade disputes to occur is reduced by 6.8% for homogeneous parliamentary dyads and by 5.6% for homogeneous semi-presidential dyads. In contrast, the likelihood of a trade dispute is reduced by only 1% and is not significant when both the challenger and the defendant have a presidential system of government. For dyads with

heterogeneous systems of government, we found significant effects on the probability of trade disputes in instances when the challenger followed a presidential system of government and the defendant a semi-presidential system of government. Compared to the situation of reference (i.e., homogenous presidential dyads), the likelihood of trade disputes was 6.5% lower. Thus, while the system of government did affect the probability of trade disputes, there was no evidence of a difference in the probability of trade disputes based on a similarity or lack thereof in the system of government of the parties involved. This is evidenced by the magnitudes of the marginal impacts under homogeneous and heterogeneous systems of government.

We expected some degree of heterogeneity with respect to the challengers and defendants' income strata and its impact on trade disputes. Such expectations were initially formulated in the conceptual analysis and were substantiated by the descriptive analysis, which provided some leads as to whether dyads with heterogeneous or homogenous income strata affect the likelihood of trade disputes differently. Using homogenous high income dyads as a reference, the results indicate that the probability of trade disputes is significantly lower for homogenous middle income dyads (-8.9%). Moreover, while there was no significant difference between heterogeneous dyads with middle income challengers and high income defendants compared to those which were homogeneous high income dyads, a significant difference was noted for heterogeneous dyads with middle income challengers (-9.2%). The results show the likelihood of trade disputes is consistently lower for dyads with middle income challengers. It also transpires from these results that a high risk of trade disputes is consistently associated with high income challengers.

We explored the extent to which the stage of democratization affects the likelihood of trade disputes. Using mature democratic dyads (i.e., both the challengers and defendants were

mature democracies) as a reference, emerging democratic dyads are 8.9% less likely to be involved in trade disputes. However, there was no significant difference between mature democratic dyads and non-democratic dyads. With respect to heterogeneous stage of democratization, lower probabilities of trade disputes were associated with emerging democratic challengers and non-democratic defendants (-12.1%), mature democratic defendants with non-democratic defendants (-7.4%), and mature democratic challengers with emerging democratic defendants (-5.5%).

The results show the stage of democratization of challenging countries has no impact on trade disputes. The results show there is a significant difference between non-democracies and mature democracies as far as being targeted for trade disputes. In fact, the probability of trade disputes increases by 8% if the targeted country (i.e., defendant) is a mature democracy. There is also a significant difference across political dyads. Trade disputes are 10.6% less likely to break out when the defendants and the challengers are of different political strata (i.e., mature democracies vs. emerging democracies). These findings are consistent with the assertion that the differences between stages of democratization play a critical role in the escalation of a trade conflict and determine which states are more likely to appeal a WTO Panel ruling, concede, offer, or accept a mutually agreed solution. While there is no consensus on the relationship between stage of democratization and trade disputes, our finding on this issue is broadly consistent with Zeng (2002, 2004) argument that the degree to which two states are complementary or competitive rivals is the most important factor in trade disputes because mature democracies tend to be competing rivals on trade issues.

For the country's degree of openness, the results show that higher trade dependency is associated with a lower propensity to initiate or to be a target of disputes. This is the case for

countries for which total trade (import and export combined) is a significant proportion of their GDP. Economic size is also a significant variable and enhances the likelihood of trade disputes so that the higher the real GDP, the more likely a country would initiate disputes. There is no evidence that a higher GDP renders countries more vulnerable to become a target of a trade dispute.

How political and economic strata may help predict the probability of disputes was analyzed using the average predicted probability of disputes across these strata (Table 4). For this purpose, we presented average predicted probabilities derived from samples of at least 100, which we compared to the overall average predicted probability of trade disputes evaluated at 15.2%. The average predicted probability of trade disputes was higher for homogeneous high income dyads, reaching 26.9% with a maximum 46.9% and a minimum of 15.4% (all of which were greater than the overall average probability). The predicted probability of trade disputes was slightly lower for heterogeneous parliamentary/presidential dyads (20.7%), homogeneous mature democracies dyads (19.7%), and heterogeneous emerging/mature democracies (18.3%). Thus, while these results made the case that trade disputes were higher for homogeneous mature democracies compared to the rest, they do not provide any clear evidence whether the probability of trade disputes is higher under heterogeneous or homogeneous stage of democratization.

Conclusions and Implications

This study analyzed conceptually and empirically the political and economic determinants of trade disputes under the WTO and attempted to shed some light into the role of underlying differences stemming from various stages of democratization, system of government, wealth, economic strength, and trade dependency of the parties involved on the probability of trade

disputes. The study yielded mixed results with respect to the nature of the political and economic system. In cases such as high income strata and mature democracies, homogeneity of the dyad seems to play a greater role at determining trade disputes. For the system of government, the heterogeneity of the parties involved was more likely to increase the probability of trade disputes.

One possible explanation pertains to the dynamic nature of the dispute settlement process, which, from the initiation to the outcome, involves the interaction between two (or more) states. In our study, we did not address third parties' roles in escalating trade conflicts or helping to enhance mutually agreed solutions. Another explanation may be linked to the rise of new economic powers such as China, India, and Brazil that renders moot the old paradigm of trade disputes, which tended to oppose rich, powerful, and democratic states. These countries have become major players in world commerce; however they are different in their systems of government and stages of democratization.

References:

Busch, Marc L. 1999. *Trade Warriors: States, Firms, and Strategic Trade Policy in High-Technology Competition.* Cambridge: Cambridge University Press.

_____ 2000. "Democracy, Consultation, and the Paneling of Disputes under GATT." *The Journal of Conflict Resolution* 44(4): 425-446.

Busch, Marc L. and Eric Reinhardt. 2002. "Testing International Trade Law: Empirical Studies of GATT/WTO Dispute Settlement," p. 457-481 in Daniel L. M. Kennedy an James D. Southwick, editors, *The Political Economy of International Trade Law: Essays in Honor of Robert E. Hudec*. New York: Cambridge University Press.

Center of International Comparison of Production, Income, and Prices. *Penn World Tables 6.2*. Available online at http://pwt.econ.upenn.edu/php_site/pwt_index.php. [Last Accessed on July 17, 2007].

Chan, Stevens. 1997. "In Search of Democratic Peace: Problems and Promise" *Mershon International Studies Review* 41:59-91.

Cohen, Benjamin. 1990. "The Political Economy of Trade." *International Organization* 44 (spring): 261-281.

Cohen, Edwards S. 2001. *The Politics of Globalization in the United States.* Washington, D.C.: Georgetown University Press.

Dixon, Greg. 1994. "Democracy and the Peaceful Settlement of International Conflict," *American Political Science Review* 88:14-32.

Election World. Available online at www.electionworld.org. [Last Accessed on February 11, 2008]

Europa World Year Book. London: Europa Publications.

Fearon, James D. 1994. "Domestic Political Audiences and the Escalation of International Disputes," *American Political Science Review* 88:577-587.

Gawande, Kishore and Pravin Krishna. 2003. "The Political Economy of Trade Policy: Empirical Approaches," p. 213-251 in *The Handbook of International Trade* edited by E. Kwan Choi and James Harrigan. Oxford: Blackwell Publishing Ltd.

Goldstein, Judith. 1996. "International Law and Domestic Institutions: Reconciling North American 'Unfair' Trade Laws," *International Organization* 50:541-564.

Grinols Earl L. and Roberto Perreli. 2006. "The WTO Impact on International Trade Disputes: An Event History Analysis." *The Review of Economics and Statistics*, 88(4): 613-624.

Huber, Peter J. 1967. "The Behavior of Maximum Likelihood Estimates under Non-Standard Conditions", vol. I, p. 221-33, in *Proceedings of the Fifth Annual Berkeley Symposium on Mathematical Statistics and Probability*, edited by Lucien M. LeCam and Jerzy Neyman. Berkeley, CA.: University of California Press.

Hoekman, Bernard M. and Michel M. Kostecki. 2001. *The Political Economy of the World Trading System: the WTO and Beyond.* Second Edition. Oxford: Oxford University Press.

Huth, Paul K. and Todd L. Allee. 2002. *The Democratic Peace and Territorial Conflict in the Twentieth Century.* Cambridge: Cambridge University Press.

Institute for Democracy and Electoral Assistance (IDEA): Available at: www.idea.org.

Inter-Parliamentary Union (IPU). Available online at www.ipu.org.

Keohane, Robert. O. 1984. *After Hegemony.* Princeton: Princeton University Press.

Krueger, Anne. O. (ed.). 1996. *The Political Economy of American Trade Policy.* Chicago: University of Chicago Press.

Lohmann, Susanne and Sharyn O'Halloran. 1994. "Divided Government and US Trade Policy," *International Organization* 48:595-632.

Maoz, Zeev and Nasrin Abdolai. 1989. "Regime Types and International Conflict, 1816-1976," *Journal of Conflict Resolution* 33:3-35.

_____. 1998. "Realist and Cultural Critiques of the Democratic Peace: a Theoretical and Empirical Re-Assessment" *International Interactions 24: 3-89.*

Marshall Monty, Jaggers, Keith and Ted Robert Gurr. *Polity IV: Political Structures and Regime Change 1800-2004.* Available online at: http://www.cidcm.umd.edu/inscr/polity/ [Last accessed on February 2008]

McGillivray, Fiona, Iain McLean, Robert Pahre, Cheryl Schonhardt-Bailey. 2001. *International Trade and Political Institutions: Instituting Trade in the Long Nineteenth Century.* Northhampton, MA: Edward Elgar Publishing, Inc.

_____. 2004. *Privileging Industry: the Comparative Politics of Trade and Industrial Policy.* Princeton: Princeton University Press.

Milner, Helen V. 1988. *Resisting Protectionism: Global Industries and the Politics of International Trade.* Princeton: Princeton University Press.

_____ 1997. *Interests, Institutions, and Information: Domestic Politics and International Relations.* Princeton: Princeton University Press.

Persson, Torsten, and Tabellini, Guido. 1999. "The Size and Scope of Government: Comparative Politics and Rational Politics." *European Economic Review* 43:699-735.

Political Database of the Americas (PDBA). Available at: www.georgetown.edu/pdba/english.html.

Putnam, Robert D. 1988. "Diplomacy and Domestic Politics the Logic of Two-Level Games," *International Organization* 42:427-460.

Rasler, Karen and William Thompson. 2003. "Monadic Democratic Peace Puzzle," *International Politics* 40:465-491.

_____. 2005. *Puzzles of the Democratic Peace: Theory, Geopolitics, and the Transformation of World Politics.* New York: Palgrave McMillian.

Ray, James Lee. 1995. "Democracy and International Conflict: an Evolution of the Democratic Peace Proposition." *International Interaction* 18:205-213.

Reed, William. 2003. "Information, Power, and War." *American Political Science Review* 97 (4): 633-641.

Reinhardt, Eric. 1999. "Aggressive Multilateralism: the Determinants of GATT/WTO Dispute Initiation, 1948-1998." Paper presented at the Annual Meeting of the International Studies Association, Washington, D.C., and February 17-20.

Reiter, Dan and Allan C. Stam. 1998. "Democracies, War Initiation, and Victory," *American Political Science Review* 92: 377-389.

Russett, Bruce. 1993. *Grasping the Democratic Peace: Principles for the Post-Cold World.* Princeton, NJ: Princeton University Press.

_____ and John R. O'Neal. 2001. *Triangulating Peace: Democracy, Interdependence, and International Organization.*

Sherman, Richard. 2001. "Targeting Democracies: Regime Type and America's 'Aggressively Unilateral' Trade Policy." Unpublished manuscript. Syracuse University.

United Nations. United Nations Statistical Database. Available at www.unstats.un.org.

World Trade Organization (WTO) Website: www.wto.org.

Wooldridge, Jeffrey M. 2001. *Econometric Analysis of Cross Section and Panel Data.* Cambridge Massachusetts: The MIT Press.

Zagare, Frank C. and Kilgoure D. Marc. 2000. *Perfect Deterrence*. Cambridge Studies in International Relations, 72. . Cambridge UK: Cambridge University Press.

Zeng, Ka. 2002. "Trade Structure and the Effects of American "Aggressive Unilateralism" Trade Policy," *International Studies Quarterly* 46:93-116.

_____ 2004. Trade Threats, Trade Wars: Bargaining, Retaliation, and American Coercive Diplomacy. Ann Arbor: The University of Michigan Press.

Table 1. Description of the Variables Used in the Analysis (Challenger vs. Defendant) 1995-2005

Variable	Category	Frequency		Percentage	
		Challenger	Defendant	Challenger	Defendant
System of Government	Presidential	845	750	53.79	47.74
	Parliamentary	677	694	43.09	44.18
	Semi-Presidential	44	122	2.80	7.77
	Communist	5	5	0.32	0.32
Stage of Democratization	Mature Democracies	1031	945	65.63	60.15
	Emerging Democracies	461	503	29.34	32.02
	Non-Democracies	79	123	5.03	7.83
Income Strata	Middle and Low Income	807	941	51.37	59.90
	High Income Non-OECD	11	0	0.70	0.00
	High Income	753	630	47.93	40.10
Election Cycle	Election	474	467	30.17	29.73
	No Election	1097	1104	69.83	70.27
Trade Dispute	Yes	260		16.55	
	No	1311		83.45	

Table 2. Distribution of Dispute Involvement as Challenger or Defendant across Countries' Political and Economic Strata (in percent)

Variable	Category	Challenger	Defendant	Difference
System of Government	Presidential	54.62	51.92	2.70
	Parliamentary	41.15	43.08	-2.93
	Semi-Presidential	3.85	4.62	-0.77
	Communist	0.38	0.38	0.00
Stage of Democratization	Mature Democracies	71.54	69.23	2.31
	Emerging Democracies	24.23	26.15	-1.92
	Non-Democracies	4.23	4.62	-0.39
Income Strata	Middle and Low Income	41.15	45.00	-4.85
	High Income Non-OECD	0.38	0.00	0.38
	High Income	58.46	55.00	3.46
Election Cycle	Election	32.69	34.23	-1.54
	No Election	67.31	65.77	1.54

Table 3: Marginal Estimates of Dyadic Panel Probit Estimation

Dyad		Coefficients	Std Error	Means
Challenger	Defendant			
Parliamentary	Parliamentary	-0.068**	0.029	0.227
Semi-Presidential	Semi-Presidential	-0.056*	0.032	0.007
Presidential	Parliamentary	-0.010	0.027	0.215
Parliamentary	Presidential	-0.011	0.033	0.161
Presidential	Semi-Presidential	-0.065**	0.029	0.028
Semi-Presidential	Presidential	-0.003	0.049	0.021
Middle Income	Middle Income	-0.089***	0.025	0.269
High Income	Middle Income	-0.048	0.033	0.191
Middle Income	High Income	-0.092***	0.023	0.323
Mature Democracies	Non Democracies	-0.057	0.040	0.041
Non Democracies	Mature Democracies	-0.074***	0.026	0.024
Mature Democracies	Emerging Democracies	-0.055**	0.028	0.197
Emerging Democracies	Mature Democracies	-0.042	0.030	0.160
Non Democracies	Emerging Democracies	-0.020	0.070	0.013
Emerging Democracies	Non Democracies	-0.121***	0.024	0.024
Non Democracies	Non Democracies	-0.021	0.040	0.013
Emerging Democracies	Emerging Democracies	-0.089***	0.024	0.109
Election	Election	0.025	0.033	0.096
--	Europe	-0.075**	0.033	0.083
Openness	--	-0.038**	0.015	3.880
--	Openness	-0.030**	0.015	3.865
Real GDP	--	0.012**	0.005	20.587
--	Real GDP	-0.004	0.005	20.634
Correlation		0.025		
Number of Observations		1571		
Number of Groups		145		
Wald Chi2		209.42		
P-value		0.000		

Notes: The parameters presented are marginal coefficients of the dyadic panel probit calculated at the means. Each dyad is comprised of a challenger and defendant that may have similar of different political system, belong to the same or different income strata, or are at similar or different stage of democratization. The signs ***, **, and * illustrate significance at the 1-, 5-, and 10% level.

Table 4: Descriptive Statistics of Predicted Probability of Trade Disputes across Select Political and Income Strata

Characteristics	Dyad		Average	Standard Deviation	Minimum	Maximum	N
	Challenger	Defendant					
Homogeneous System of Government	Parliamentary	Parliamentary	0.136	0.071	0.023	0.301	357
	Presidential	Presidential	0.152	0.067	0.028	0.336	459
Heterogeneous system of Government	Presidential	Parliamentary	0.188	0.095	0.054	0.469	337
	Parliamentary	Presidential	0.207*	0.076	0.086	0.387	253
Homogeneous Income Strata	High Income	High Income	0.269*	0.081	0.154	0.469	330
	Middle Income	Middle Income	0.105	0.051	0.023	0.285	507
Heterogeneous Income Strata	High Income	Middle Income	0.148	0.044	0.032	0.293	423
	Middle Income	High Income	0.181*	0.050	0.086	0.353	300
Homogeneous Stage of Democratization	Mature Democracies	Mature Democracies	0.197*	0.097	0.023	0.469	656
	Emerging Democracies	Emerging Democracies	0.087	0.024	0.050	0.150	172
Heterogeneous Stage of Democratization	Mature Democracies	Emerging Democracies	0.157*	0.060	0.038	0.336	310
	Emerging Democracies	Mature Democracies	0.183*	0.046	0.096	0.285	251

Notes: The overall average probability of trade disputes is estimated at 0.152 and based on the overall sample of 1571. This table presents the predicted probabilities pertaining to various dyad characteristics based on sample size of at least 100. The asterisk sign (*) indicates where these predicted probabilities were higher than average probability.