LEGALIZATION OF INTERNATIONAL INSTITUTIONS AND GLOBAL ECONOMIC ORDER

A Dissertation

by

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ABSTRACT

Many scholars criticize international organizations and multilateral negotiations, arguing that they are driven by power politics. The current trend towards legalization of international institutions calls existing views on how international institutions shape state behavior into question. In the large literature on international adjudication, many theories and empirical results conflict with one another. In the context of international trade institutions, I examine whether legalization of dispute settlement mechanism helps put small and weak states on an equal footing with powerful states, thereby maintaining the liberal international trade order. I develop a game theoretic model of trade disputes and examine trade bargaining across international trade regimes. I test the implications of my theory using original data on disputes at the GATT/WTO from 1980 to 2018 and post-dispute trade flows for each GATT/WTO dispute initiated between 1989 and 2015.

DEDICATION

This dissertation is dedicated to my family and *Chanel Jung*.

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1. INTRODUCTION

The rise of China and other members of the BRICS and a series of crucial events such as the Asian financial crisis of 1997 and the global crisis of 2008 have transformed the global economic landscape. The changing dynamics of the global trade system have posed serious challenges for interests of large economies such as US and EU who have played a central role in the rule-based multilateral trading system since the end of World War II.

Despite these challenges and reforms, international institutions have long sustained the liberal international economic order since 1944. The World Trade Organization (WTO) and its predecessor -The General Agreement on Tariffs and Trade (GATT)- have been the central institutional pillars of the Bretton Woods system. In recent years, however, the mood about the WTO and its dispute settlement system has shifted dramatically. The US President Trump has clearly expressed his distaste for the WTO which he widely criticized as unfair to US interests. By blocking judicial appointments to the WTO's Appellate Body, not only did he paralyze the 25-year-old system of resolving disputes, he also put at risk the foundation of the global trading system and economic order. As noted by Cecilia Malmström, the EU Commissioner for Trade, "The appellate body function of the WTO dispute settlement system is moving towards a cliff's edge. Without this core function of the WTO, the world would lose a system that has ensured stability in global trade for decades."[1]

It seems clear that the Trump administration wants the world economic order revert to the glory days under the GATT where the largest economies wielded power to change the behavior of others. As we know, however, the old system has been replaced for that reason. It is more important than ever that we look at economic relations between hostile economic

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[1] "WTO reform: EU proposes way forward on the functioning of the Appellate Body," `https://trade.ec.europa.eu/doclib/press/index.cfm?id=1945`. Accessed June 15, 2020.

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partners, changing dynamics of the global economy, and discontent among states at the institutional changes. In my dissertation, I address pressing concerns over the institutional design of dispute settlement, its consequences of power disparity, and the future of the multilateral trading system more broadly. In doing so, I focus on two salient trends in international trade systems over the last two decades: the legalization of international institutions and the proliferation of regional trade agreements (RTAs).

In recent decades, world politics has become increasingly legalized[2] through the creation of international courts or court-like institutions across issue areas (e.g. trade and investment, peace and security, health and human rights, and the environment). One of the major changes of the WTO from its predecessor was the transition to a strongly legalized dispute resolution system. The WTO provides more precise, elaborated, and binding rules and timelines than the GATT. Countries can no longer wield a veto in the new system and hence, small and poor countries are able to bring more disputes against more powerful countries. The introduction of the permanent Appellate Body composed of highly-qualified lawyers contributes to the rule of law in the trading system. By restricting the use of escape clauses and safeguards, the WTO also constrains opportunistic behavior by members.[3]

The WTO's dispute settlement mechanism is widely recognized as one of the most legalistic institutions. Extant literature has analyzed the role of the WTO's dispute settlement system (e.g. Chaudoin, Kucik, and Pelc, 2016; Rosendorff, 2005; Sattler, Spilker, and Bernauer, 2014). Despite the criticisms of increased legalization of international institutions (e.g. Goldstein and Martin, 2000; Kim, 2008) many studies of international adjudication show the effectiveness of the WTO's newly upgraded dispute resolution system (e.g. Davis, 2012; Rosendorff, 2005).

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[2]Legalization refers to a set of institutional characteristics with three dimensions: obligation for compliance through binding rules, precise and highly elaborated rules, and delegation to international arbitration (Abbott et al., 2000).

[3]See, for example, Goldstein and Martin 2000.

In the following two chapters, I ask: Does the WTO's legalized dispute settlement mechanism provide a more level playing field for small and weak countries than the GATT? Building on Rubinstein's alternating-offer bargaining model,[4] Chapter 2 examines how the legalized dispute settlement mechanism benefits less powerful states in trade disputes with their more powerful counterparts. My game theoretic analysis demonstrates that weak complainants are more likely to benefit from the WTO than the GATT due to structural advantages of the WTO's dispute settlement mechanism granted to complainants. Nevertheless, fair adjudication which supports specific and firm rules of the dispute resolution system is necessary for weak complainants to insulate themselves from power politics. These results suggest that the sheer existence of legalized international arbitration alone is not an effective means of empowering weak members.

In Chapter 3, I test the empirical implications of the key theoretical and substantive findings of my game-theoretic work. I argue in the affirmative: the enhanced legal features of the WTO's dispute settlement mechanism provides bargaining leverage for small and poor countries so that they have fared better than under the GATT. Using original data on disputes at the GATT and the WTO from 1980 until 2018 and post-dispute trade flows for each GATT/WTO dispute initiated between 1989 and 2015, my statistical analysis illuminates the patterns of disputes over international trade regimes and the distributional effects of institutional design of dispute settlement mechanisms, and further the effects on the "rigidity and stability" of the multilateral trading system. Empirical evidence supports my arguments that the more legalized system of dispute settlement provides a more level playing field for small and poor countries by proving bargaining leverage for them to gain more from disputes with their more powerful counterparts.

Along with the rise of global economic interdependence, regional trade agreements have become increasingly common in the international trading system since the end of World

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[4]See Rubinstein 1982.

War II. The number of RTAs has increased rapidly during the past two decades. In particular, it doubled to reach more than 400 RTAs in force from 2000 to 2016. Most nations are now involved in one or more RTAs; even nations without any RTAs are not completely outside the range of RTAs. As Bhagwati and Krueger (1995) have put it, we now live in a world like a "spaghetti bowl" where every nation is connected with different types of RTAs in a very complex way.

Although there is a great variation, almost all RTAs have systems of dispute resolution. Yet, the WTO has been used much more frequently than RTA for dispute resolution (Chase et al., 2013). The empirical irregularity of disuse of RTA dispute settlement mechanisms (DSMs) leads to the next puzzle: Why do countries agree to build dispute settlement systems in regional trade agreements but do not resort to such systems to resolve their disputes? Seeking answers to the puzzle, I compare the institutional designs of dispute settlement between the WTO and RTAs in Chapter 4.

Rosendorff (2005) shows that legalization of the WTO helps to enhance systemic stability by bringing flexibility into the strategies of member countries. I extend Rosendorff's model of the WTO's dispute settlement mechanism to demonstrate that regional trade agreements increase power disparities more than the WTO by providing greater flexibility in using dispute resolution strategies to powerful countries.

The model predicts that an RTA's dispute settlement mechanism will increase the flexibility gap between the poor and the rich. RTA arbitration grants more room for powerful countries to manipulate the international trading system when it comes to disputes. Less powerful countries are less likely to have flexibility in RTA arbitration than they would have under WTO arbitration. As a result, less powerful countries are more likely to insulate themselves from power politics in the WTO than RTAs. This implies that the frequent use of WTO adjudication results from the systemic superiority of the WTO compared to RTA adjudication.

This result also implies that the increased disparity in strategic flexibility will lead to increases in per period probability of breakdown and, consequently, reduce the stability of the trading system. An RTA's dispute settlement mechanism generates a trade-off in gains between large and small countries, rather than the trade-off between "rigidity and stability" as in the WTO. And the significant loss sustained by weak countries incurs the cost of stability of the regional trading system.

The conclusion chapter reviews the theory about the role and the distributional consequences of the institutional design of dispute settlement across international trade regimes. It highlights the key findings of this dissertation and contributions in the literature.

2. BARGAINING IN THE SHADOW OF A DISPUTE SETTLEMENT MECHANISM: GATT VS. WTO ADJUDICATION

2.1 Introduction

Many scholars criticize international organizations and multilateral negotiations, arguing that they are driven by power politics (e.g. Brutger and Morse, 2015; Stone, 2011; Vreeland, 2007).[1] For example, the United Nations Security Council (UNSC)'s veto power reflects the power of its five permanent members: China, France, Russia, the United Kingdom, and the United States. As for the International Monetary Fund (IMF), the weighted voting mechanism grants the United States approximately 17% of the vote share while small countries such as Jamaica and Haiti have less than 1%.[2] In recent decades, world politics has become increasingly legalized[3] through the creation of international courts or court-like institutions across issues areas (e.g. trade and investment, peace and security, health and human rights, and the environment).[4]

Does legalization of international institutions mitigate or magnify power asymmetries? There are two competing views of the legalization of international institutions and its consequences for power politics. Some argue that legalization mitigates power asymmetries because legalized international institutions apply laws equally to all members and enforce

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[1]As Stone argued, "Informal governance, then, is for the benefit of powerful countries, and it allows powerful countries to avoid outcomes that they could not commit to tolerating ... the most important elements of institutional design are explained by the distribution of power" (223).

[2]Jamaica and Haiti have approximately 0.08% and 0.03% of the vote share, respectively. "IMF Members' Quotas and Voting Power, and IMF Board of Governors," `http://www.imf.org/external/np/sec/memdir/members.aspx`. Accessed December 13, 2018.

[3]Legalization refers to a set of institutional characteristics with three dimensions: obligation for compliance through binding rules, precise and highly elaborated rules, and delegation to international arbitration (Abbott et al., 2000).

[4]Notable examples are the Dispute Settlement Understanding (DSU) of the WTO, the International Centre for Settlement of Investment Disputes (ICSID), the International Court of Justice (ICJ), the European Court of Justice (ECJ), the International Criminal Court (ICC), and the European Court of Human Rights (ECHR).

adjudication decisions. Yet others argue that legalization reinforces power asymmetries rather than providing members with equal rights. Highly legalized international institutions require greater legal capacity for member states to initiate a claim and to utilize legal processes. Given that small and weak states often lack legal capacity[5] and retaliatory power against powerful counterparts, legalized international institutions are merely responsive to powerful states.[6]

I answer this question in the context of the transition from the General Agreement on Tariffs and Trade (GATT) to the World Trade Organization (WTO) dispute settlement mechanism (DSM). In particular, I address the following question in this paper: Does the WTO provide a more level playing field than the GATT?[7] In international trade governance, there has been a trend towards legalization through reform and development of the DSM. The WTO DSM, in particular, is widely recognized as one of the most legalistic institutions. A large and growing body of literature has emerged to analyze the role of the strong dispute settlement system of the WTO (e.g. Kim, 2008; Rosendorff, 2005; Sattler, Spilker, and Bernauer, 2014). Some argue that the strongly legalized dispute settlement system of the WTO provides a more level playing field (e.g. Horn, Mavroidis, and Nordström, 1999). For example, strengthening the rule of law in multilateral trade regimes raises the costs of defection, which leads to cooperative behavior (e.g. Baccini and Kim, 2012; Busch and Reinhardt, 2000; Sattler, Spilker, and Bernauer, 2014). Others claim that international institutions inevitably reflect the unequal distribution of power (e.g. Bown, 2005; Guzman and Simmons, 2005).

The most striking change of the WTO from its predecessor GATT in 1995 was the transition to a strongly legalized dispute resolution system. The WTO DSM provides more precise,

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[5]This is the so-called "participation deficit" (Johns and Pelc, 2016).

[6]There are competing views on the creation of legalized international institutions associated with these different views on the effect of legalization: (1) why do powerful states choose legalized institutions which constrain their autonomy? vs. (2) what motivates small and weak states to join international institutions which are merely responsive to powerful states? See, for example, Goldstein and Steinberg 2008; Pelc 2010; Thompson 2007; and Stone 2011.

[7]In a broader context, the question I address is: Does the legalization of international institutions mitigate or magnify power politics?

elaborated, and binding rules and time lines than the GATT. For example, the introduction of the permanent Appellate Body (AB) composed of highly-qualified lawyers contributes to the rule of law in the multilateral trading system. By restricting the use of escape clauses and safeguards, the WTO also constrains opportunistic behavior by members (e.g. Goldstein and Martin, 2000). The introduction of the semi-automatic establishment of panels and adoption of panel/AB reports does not allow a losing party to block a dispute settlement procedure anymore.[8] Panel rulings,[9] therefore, are automatically adopted unless a disputant appeals or there is a consensus to reject it from all other WTO members including disputing parties. Under the old GATT, however, the losing party is allowed to block or veto the adoption of a panel report.[10] In sum, as noted by Lacarte-Muro and Gappah, "*right* perseveres over *might*" under the WTO DSM.[11]

I argue that the legal power of the WTO helps serve the needs of weak states better than the GATT by empowering them in the dispute resolution procedure. The structural advantages the WTO grants complainants—specifically, the unilateral right to a panel and the automatic adoption of a ruling—increase their bargaining leverage relative to the GATT. Due to the increased bargaining leverage, concessions are more likely to occur under the WTO than the GATT. Nevertheless, fair adjudication which supports specific and firm rules is necessary for the WTO to allow weak complainants to insulate themselves from power politics and offer a voice to less powerful states.

I develop a game theoretic model of trade disputes that applies to three types of international trade agreements. The model focuses on the early stages of a dispute settlement process, before a panel circulates its final report - consultations, panel establishment, and

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[8]For a critical review of WTO DSM practice, see Hudec 1999; and Zimmermann 2005.

[9]Panel rulings clarify rules and pressure violating parties to lift illegitimate trade barriers

[10]For an excellent overview about the differences between the DSM of the GATT and the WTO, see Busch and Reinhardt 2003*a*. On the differences in the panel procedures, specifically, see Kantchevski 2006.

[11]Lacarte-Muro and Gappah (2000) argue that small and poor countries are able to bring complaints under the WTO, which is highly unlikely under the GATT (401).

panel composition - because during those stages (1) a majority of GATT/WTO disputes filed end, and (2) complainants tend to get the fullest concession.[12]

The model allows me to make predictions for three different scenarios. In the baseline model, there are two disputants who take turns making offers over the division of a disputed good without an intervention of international arbitration. The extension of the model allows disputants to delegate to third-party adjudication and takes two forms with respect to the use of unilateral right to a panel and the automatic adoption of a ruling. In the baseline model, I find that a complainant without bargaining leverage gets nothing in equilibrium. With an international arbitration where a defendant is able to block either panel proceedings or the adoption of panel reports, the GATT model predicts that a complainant has bargaining leverage when (1) a defendant gets a substantial amount of additional benefit from winning the case through delegation, and (2) a complainant's chance of winning the dispute through delegation exceeds her cost of litigation.

Given that those conditions are unlikely to be satisfied simultaneously, the results suggest that a complainant is unlikely to have bargaining leverage under such an international institution. In the model where a defendant is not allowed to block either panel proceedings or the adoption of panel reports, a complainant benefits over the baseline model when a complainant's chance of winning the dispute through delegation exceeds her cost of litigation. The WTO model shows that a defendant being unable to block delegation and the adoption of panel reports leads to more concessions in bargaining in the shadow of international arbitration.

Thus, the results suggest that the WTO, which does not allow a defendant to block delegation and the adoption of panel reports, is able to serve the needs of weak states better than the GATT by empowering them in the early stages of the dispute resolution process.

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[12]Those (mostly fullest) concessions come from the threat of legal condemnation (Busch and Reinhardt, 2000, 2003*a*).

The results also suggest that the GATT fails to come to grips with the fundamental problems affecting the unequal distribution of economic power and wealth. This implies that the sheer existence of legalized international arbitration alone is not an effective means of threat by which weak states insulate themselves from power politics. Specific and firm rules supported by fair international adjudication are necessary to allow complainants to insulate themselves from power politics. This research contributes to the literature on the legalization of world politics by developing a model to examine the impact of international arbitration on power asymmetries.

2.2 Legalization and GATT/WTO DSM

Previous studies in the literature of international politics and law largely suggest positive effects of legalization on international cooperation (e.g. Keohane, Moravcsik, and Slaughter, 2000; Maggi, 1999). In this literature, the WTO DSM has received considerable scholarly attention. As noted by Bechtel and Sattler (2015), the WTO is "a prime example for the stronger legalization and delegation of authority observable in international politics"(376). Conventional wisdom suggests that the WTO, vested with more legal power through the DSM, helps facilitate the level of cooperation and mitigate power asymmetries (e.g. Chaudoin, 2010; Goldstein et al., 2000b; Smith, 2000).[13] Previous studies identify various mechanisms by which the DSM shapes state behavior including increasing the costs of defection (e.g. Goldstein et al., 2000b; Smith, 2000), transmitting information to voters regarding a nation's trade behavior (e.g. Chaudoin, 2010; Fang, 2008), and allowing temporary defection in response to high domestic political pressure (e.g. Fearon, 1998; Rosendorff, 2005).[14] Recent studies also assess how domestic politics shapes state behavior under the legal dispute system of multilateral

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[13]In the international law literature, there is "a particularly warm, if not enthusiastic, welcome" for the WTO DSM (Zimmermann, 2005, 35).

[14]Rosendorff (2005) considers the WTO DSM as an insurance against domestic fluctuations, which leads to an increase in systemic stability of the multilateral trading system.

negotiations (e.g. leader turnover,[15] audience costs,[16] and domestic institutions[17]).

In the meantime, a growing literature began to take legalization into consideration and to argue that legalized institutions fail to meet expectations. They claim that even international institutions with strong legal teeth fail to mitigate power asymmetries; rather, those institutions still reflect the relative power of member countries. The highlighted drawbacks associated with legalization include lack of strong punishment (e.g. Ludema, 2001), discrimination in participation against weak states (e.g Busch and Reinhardt, 2003a; Davis and Bermeo, 2009), and excess litigation (e.g. Goldstein and Martin, 2000; Simmons, 2014). Poor and small countries have fared worse in legalized international institutions because the strong DSM deters the use of harsh punishment, causing inefficient outcomes in negotiations. Ludema (2001) argues that the use of stronger punishment against defections disabled by the DSM reduces the level of national welfare by preventing countries from using autarky as a part of the punishment.[18]

In addition, several studies argue that the increased legal costs of highly legalized DSMs discourages developing countries from participating because they lack resources to monitor and recognize WTO violations, and go through subsequent legal proceedings (e.g. Bown, 2005; Busch and Reinhardt, 2003a; Davis and Bermeo, 2009). As a result, legalized institutions fail to provide a level playing field to less powerful countries unless they have the legal capacity and expertise to participate in legal disputes. For example, Davis and Bermeo (2009) argue that the potential for legalization to reduce power asymmetries depends on weaker countries learning to navigate the legal system. By examining the initiation of disputes in the WTO from 1975 to 2003, they find that past experience in trade adjudication increases the likelihood that a developing country will initiate disputes. As weaker countries overcome these initial

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[15]See Bobick and Smith 2013.

[16]See Allee and Huth 2006; and Chaudoin 2014.

[17]See Betz 2018; Betz and Kerner 2016; and Peritz 2017.

[18]There exists an opposite claim that a harsher punishment against defection by member states helps strengthen the bargaining power of developing countries (e.g. Park, 2000).

capacity constraints they will increasingly benefit from the international legal structures they have joined. In sum, the existing literature provides mixed findings on the role of legalization of international institutions, in the context of the WTO, in particular.

This research contributes to the literature on international institutions and international adjudications by developing a game-theoretic model to explain how legal features of dispute settlement mechanisms shape state behavior and affect distributional consequences of international cooperation. The theory and findings of this research deepen our understanding of legalized dispute settlement mechanisms. A series of bargaining models demonstrates that the legal teeth of the WTO increases the size of the pie for weak complainants.

2.3   Bargaining and Early Settlement

Both The GATT and the WTO systems advocate the use of consultations to settle differences between disputing parties as an effective means of dispute resolution. Consultations refer to private negotiations between the parties for the purpose of reaching mutually satisfactory solutions. The case filed can proceed to the panel stage if: (1) parties fail to reach an agreement during consultation, and (2) the complainant party requests the establishment of a panel. In other words, if a mutually agreed settlement is not reached at the consultation stage, the complaining party may request a panel to adjudicate the dispute.[19] Early settlement occurs if a case is withdrawn because disputing parties reach a mutually agreed solution prior to a ruling. Early settlement refers to concessions negotiated in advance of a panel ruling; it includes both settlement during consultations and settlement after the consultation stage but prior to a ruling. For example, the case of "US-Anti-Dumping Duties on Imports of Colour Television Receivers from Korea" (DS89) was settled with the revocation of anti-dumping duty orders. South Korea formally withdrew its request for a panel on September 15th, 1998. Also,

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[19]The request can be made by the complainant any time 60 days after the date of receipt by the defendant of the request for consultations. The complainant is allowed to make the request earlier. For details, see Article 4.7 of the DSU.

the case of "EC-Definitive Safeguard Measure on Salmon" (DS326) brought by Chile ended in early settlement with the termination of the safeguard measure against imports of farmed salmon. On May 12th, 2005, Chile formally withdrew its request for consultations.[20]

A majority of GATT/WTO disputes filed never proceed beyond the consultation stage or a panel ruling.[21] Nevertheless, previous works largely focus on initiation, panel proceedings, and the aftermath of panel/AB rulings, leaving private settlements prior to a ruling understudied in this literature.[22] Only a handful of studies assess consultations and early settlement to examine the effect of the GATT/WTO DSM (e.g. Bechtel and Sattler, 2015; Busch and Reinhardt, 2000, 2003a). In particular, Busch and Reinhardt show that the GATT/WTO system allows members to bargain in the "shadow of law" where defendants tend to offer the greatest concessions. Johns and Pelc (2016) also claim that the litigants prefer private settlements because: (1) they allow the defendant to avoid the normative impact of an adverse ruling, and (2) they allow the litigants to reach an agreement away from domestic interest group pressure.

Early settlement is hard to measure compared to settlement after a panel ruling. When disputing parties reach a mutually agreed solution to the related issue during consultations

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[20]Other examples are: Mexico-Certain Pricing Measures for Customs Valuation and Other Purposes (DS298) brought by Guatemala against Mexico, and EC-Regime for the Importation of Bananas (DS364) brought by Panama against the EC.

[21]Another way a dispute filed would not proceed to a panel ruling is to be dropped (a.k.a. abandoned cases). Such cases remain in consultations without a formal settlement or a panel established. For example, the Philippines requested consultations with the U.S. regarding import prohibition of certain shrimp and shrimp products imposed by the U.S. (DS61) on October 25th, 1996. On May 27th, 1998, India requested consultations with the E.C. with respect to the restrictions on certain import duties on rice (DS134). These cases have remained with the status "in consultations" since then. Other examples are: US-Safeguard Measure Against Imports of Broom Corn Brooms (DS78) brought by Colombia against the U.S., and China-Grants, Loans and Other Incentives (DS390) brought by Guatemala against China. About 20% of all merchandise disputes end in a mutually agreed solution prior to the formation of a panel; and "no less than 35 percent of all disputes" are abandoned (Chaudoin, Kucik, and Pelc, 2016). Previous studies suggest various reasons why those cases get dropped (e.g. lack of legal expertise, weak merits of the case, a settlement under domestic pressure). However, dropped cases are beyond the scope of this study, and I focus on bargaining which leads to mutually agreeable concessions.

[22]Various potential dispute outcomes include panel not established, no ruling with panel established, ruling for complainant, mixed ruling, and ruling for defendant (Busch and Reinhardt, 2000).

or prior to a panel ruling, they notify the DSM with a complainant's withdrawal of its request for consultations and a defendant's objection to that request, if any. Due to a lack of official records such as panel or AB reports, previous observational studies fail to capture the dynamics of the GATT/WTO dispute settlement in the early stage. For example, Busch and Reinhardt (2003a) coded cases of early settlement based on the level of concessions by the defendant. They gave cases 1 if they end with no ruling and full concessions, and 0 otherwise. The dichotomous measure hardly captures heterogeneity in bargaining strategies and settlement outcomes. In this study, I utilize a game-theoretic approach in examining the bargaining mechanism with international arbitration under the GATT vs. the WTO.

Formal models have provided various theoretical accounts of the design of international institutions and the effects of the design on international cooperation (e.g. Fang, 2010; Manzini and Mariotti, 2004). Gilligan, Johns, and Rosendorff (2010) emphasize the role of the GATT/WTO DSM in providing information to disputing parties.[23] Johns (2012) suggests the role of international courts in coordinating endogenous enforcement by the group of disinterested parties. Johns (2016) further provides a general theoretical framework for examining the effects of the design of an international legal regime on state behavior. Compared to her model and findings in the context of the GATT/WTO, I focus on examining the role of the GATT/WTO DSM in mitigating power asymmetries between disputants.

Using a bargaining model across different scenarios, I show under what conditions, where in the process, and to what extent, international arbitration empowers a weak party in the process of dispute settlement against its powerful counterpart. My model assumes that powerful states are willing to wield their power to get away with violating agreements. Thus, the model differentiates players by their relative power such that a defendant is more powerful than a complainant. I begin with private bargaining between disputants and extend to bargaining with international arbitration which captures institutional characteristics of

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[23]Similarly, Carrubba 2005, 2009; and Johns and Rosendorff 2009.

the GATT and later, the WTO.

Among the many differences between the GATT and the WTO, I focus on the right of delegation. In this paper, delegation refers to both the establishment of a panel and the adoption of panel reports. Thus, delegation fails if the respondent blocks the complainant's proposal of delegation or the adoption of a panel report.[24] The current WTO system builds on the previous GATT system which has evolved considerably over the years. Under *GATT 1947*, the defendant could block panel proceedings by delaying (indefinitely) the establishment of a panel. Moreover, the adoption of panel reports required a positive consensus (i.e., no objection from any member to the decision). This enabled the losing party to block or veto the adoption of the panel report. This threat of veto is often considered a legal loophole of the GATT.

An important modification of the dispute resolution system has been made through the 1989 *Dispute Settlement Procedure Improvements*. The reform prevents a defendant from tactically blocking the complainant's request for a panel by delaying it significantly. Before the reform, there were two options for the respondent who disagrees with the complainant's proposal of delegation: (1) block panel proceeding by delaying panel establishment, or (2) reject the adoption of panel reports. After the reform, however, to reject the adoption of a panel report is the only option. Given that the defendant is still able to block arbitration after the 1989 reform, the basic setting of the GATT bargaining game in this paper remains the same before and after the reform.[25]

In contrast, the WTO empowers complainants with the unilateral right to request a panel formation and an automatic adoption of panel reports. The WTO prevents a respondent

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[24]Note that any member (possibly the losing party) blocks the adoption of a panel report.

[25]It is noteworthy that the parties might be still bargaining after the panel is established, and even after panel ruling is circulated. Shaffer (2009) concurs, noting, "WTO members sometimes begin settlement negotiations only after the panel ruling is issued"(174). For example, the bargaining over the modification of the U.S. *foreign sales corporation* tax subsidies were in progress between the U.S. and the EC even years after the panel ruling had been issued.

from blocking not only the panel proceeding (carried over the 1989 GATT reform) but also the adoption of panel reports. The complainant's request of panel composition does not need a respondent to agree, and the parties to the dispute must unconditionally accept a ruling. A panel ruling is automatically adopted unless a party formally notifies the DSB its decision to appeal or there is reverse consensus, a consensus in the DSB against the adoption (Article 16.4, DSU). Under a rule of reverse consensus, a single member is not sufficient to reject the adoption of the report, but sufficient to secure it. Note that even a majority is not sufficient to prevent the adoption under the WTO. As Busch and Reinhardt (2003*a*) put it, "The *Improvements* gave complainants a way to escape the power politics of the consultation stage"(150). The legal teeth enables complainants to obviate their counterparts' threat of blocking.[26]

2.4   The Model

Consider the following standard alternating-offer bargaining setting, as in Rubinstein.[27] Two countries, C (Complainant, henceforth "she") and D (Defendant, henceforth "he"),[28] dispute the distribution of an infinitely divisible good, such as the interests of C harmed by D's trade violations, whose size is normalized to 1. They take turns making offers over the division of the pie. For example, settlement over trade disputes refers to taking down trade barriers such as tariffs or subsidies and compensating affected trading partners. The game starts with C's offer $(x_C, 1 - x_C)$ where $x_C \in [0, 1]$ is player C's share and $1 - x_C$ is D's share. Then D decides either to accept or to reject the offer. If D accepts, the game ends; if not, the game moves to the next round where D makes a counter-offer. The game continues until one's proposal

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[26]For the sake of simplicity, the model does not capture different stages of litigation such as panel establishment, panel ruling, and AB ruling.

[27]See Rubinstein 1982.

[28]For simplicity's sake, the model assumes a single-party Complainant and Defendant. In practice, however, there could be multiple complainants, defendants, and/or third-parties to a dispute. For example, under the GATT/WTO, every member can participate in a dispute of another member as a third party (pro-Complainant, pro-Defendant, or even mixed).

is accepted by the other. Let $(SQ_C, 1 - SQ_C)$ denote the status quo division of the disputed good, where SQ_C is C's share and $1 - SQ_C$ is D's share. Henceforth, I will assume that $SQ_C = 0$, meaning that at each failed round, the disputed good entirely belongs to D.[29] Both players discount their future payoffs by a common discount factor $\delta \in (0, 1)$.

Figure 2.1: Private bargaining model in trade disputes
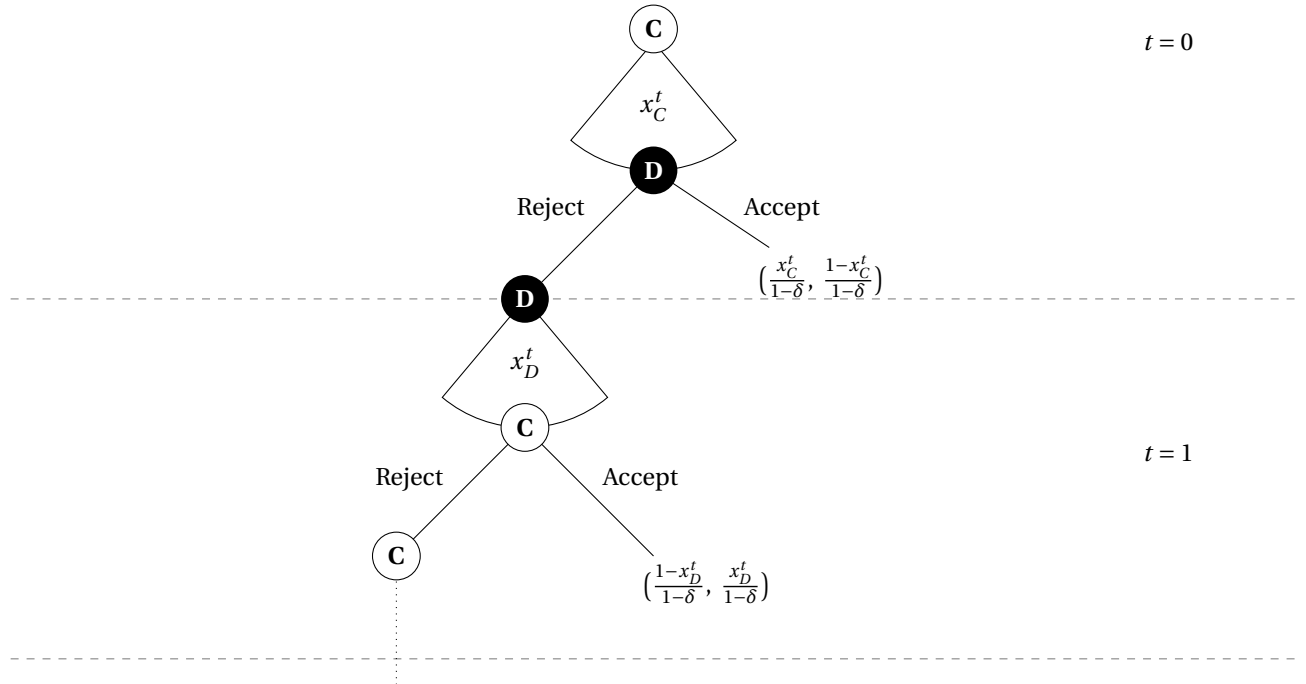
If players agree to a settlement, bargaining ends, and players receive the new division of the pie such as the termination or reduction of unfair trade barriers for the remaining periods of the game.[30] Given that the agreed-upon proposal will remain in force for the remaining infinite future, if an agreement is made in any even-numbered periods where C makes an offer x_C^t, players receive payoffs $\left(\frac{x_C^t}{1-\delta}, \frac{1-x_C^t}{1-\delta}\right)$.[31] If an agreement is made in any

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[29]In Rubinstein's bargaining model, the status quo of each player is set to zero for both players.

[30]The game assumes that the agreement will be kept forever without a breach. In practice, a break is subject to breach. I assume that a breach opens up another bargaining over trade dispute.

[31]Note that from the perspective of $t = 0$, players get $\left(\frac{\delta^t x_C^t}{1-\delta}, \frac{1-\delta^t x_C^t}{1-\delta}\right)$. For D's payoff, C's offer x_C^t at time t

odd-numbered periods where D makes an offer x_D^t, players receive payoffs $\left(\frac{1-x_D^t}{1-\delta}, \frac{x_D^t}{1-\delta}\right)$. The game tree is shown in Figure 2.1. The solution concept is Subgame-Perfect Equilibrium (SPE), specifically I look for a (stationary) no-delay SPE where each player always makes the same offer (stationarity) and accepts the equilibrium offer immediately (no delay). The following proposition describes the results of the private bargaining game.

Proposition 1 (Bilateral EQ). *Whenever C proposes, she offers $x_C = 0$ and accepts any offer $x_D \leq 1$. Whenever D proposes, he offers $x_D = 1$ and accepts $x_C = 0$. Thus, bargaining ends immediately with a split (0, 1).*

If there is no institution, then C has no bargaining leverage (since the model does not allow for C to retaliate on other issues, although that would be an interesting avenue for future research) and hence D has no reason to make concessions. In equilibrium, D keeps the entire pie and C gets nothing.

2.4.1 Bargaining in the Shadow of Arbitration: GATT vs. WTO

Now suppose the model features bargaining under the shadow of international arbitration under the GATT or the WTO. In both GATT and WTO bargaining games,[32] C has an additional way to respond to D's offer other than *Accept* and *Reject*: *Delegate* to third-party adjudication. If C chooses delegation, D will decide whether to reject or accept in the GATT bargaining game.[33] Without D's agreement, international adjudication fails to occur and the game ends with status quo payoffs $\left(0, \frac{1}{1-\delta}\right)$. If D accepts, private bargaining ends, and the case proceeds to litigation. If international adjudication takes place, then the outcome is a

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gives $D\left(1+\delta+\delta^2+\cdots+\delta^{t-1}\right)+\delta^t(1-x_C^t)+\delta^{t+1}(1-x_C^t)+\delta^{t+2}(1-x_C^t)+\cdots = \frac{1-\delta^t}{1-\delta}+\frac{\delta^t(1-x_C^t)}{1-\delta} = \frac{1-\delta^t x_C^t}{1-\delta}$. Note that following a formula to calculate the sum of the first t terms of a geometric sequence, $1+\delta+\delta^2+\cdots+\delta^{t-1}$ is $\frac{1-\delta^t}{1-\delta}$.

[32]The GATT/WTO bargaining game refers to the alternating-offers bargaining model with institutional features of the GATT/WTO.

[33]In practice, there are two ways for D to reject C's proposal of delegation: (1) reject C's request of panel establishment, and (2) reject the adoption of panel reports. The bargaining model in this paper does not differentiate them; rather, delegation refers to the direct loss of state control over the issue.

game-ending costly lottery, with C winning with probability $(1-a)\theta$ and the prize of winning 1, D winning with probability $1-(1-a)\theta$ and the prize of winning $(1+b)$, where $a \in (0,1)$ is the level of bias toward D,[34] $\theta \in (0,1)$ is the merits of C's case,[35] and $b > 0$ is an additional small benefit to D if he prevails in international courts.[36] In the case of international adjudication, both players also pay the costs of arbitration $C_C, C_D > 0$. Thus, if international arbitration occurs, the game ends with the payoffs $\left(\frac{(1-a)\theta-C_C}{1-\delta}, \frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta} \right)$. Figure 2.2 displays a game tree of the GATT bargaining model. Proposition 2 characterizes the SPE of the GATT bargaining game.

Proposition 2 (GATT EQ). *Define the following threshold:* $b_{crit} \equiv \frac{C_D+(1-a)\theta}{1-(1-a)\theta}$. *Then the following is the subgame-perfect equilibrium (SPE) of the GATT-bargaining game.*

(i) *If $b < b_{crit}$,[37] $\forall a \in (0,1)$ whenever D proposes, he offers $x_D = 1$, accepts $x_C = 0$, and rejects if C chooses to delegate. Whenever C proposes, she offers $x_C = 0$, accepts any $x_D \leq 1$, and prefers rejecting over delegating. Bargaining ends immediately with a split $(0,1)$.*

(ii) *If $b > b_{crit}$, for $(1-a)\theta < C_C$ whenever D proposes, he offers $x_D = 1$, accepts $x_C = 0$, and accepts if C chooses to delegate. Whenever C proposes, she offers $x_C = 0$, accepts any $x_D \leq 1$, and prefers rejecting over delegating. Bargaining ends immediately with a split $(0,1)$.*

(iii) *If $b > b_{crit}$, for $(1-a)\theta > C_C$ whenever D proposes, he offers $x_D > 1 - (1-a)\theta + C_C$,*

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[34]Given that $0 < a < 1$, I assume that the disputes are not only judged by the merits of the case but also by the distribution of power across disputing parties. If international arbitration is perfectly fair and disputes are hence judged solely by the merits of the case, then $a = 0$ in the model.

[35]This captures to what extent a defendant's violating behavior harms the interests of the complainant.

[36]There are various sources of additional benefit b. For example, the GATT/WTO rulings would set a precedent for other related issues in the future as well as in other regional trade agreements. There is a prestige benefit of having third-party adjudication endorse your position on a dispute. At the domestic level, the legalized GATT/WTO systems of dispute resolution tie the hands of leaders to respect rulings, which enables them to resist domestic pressure for protection.

[37]If $b = b_{crit}$, then D is indifferent between rejecting and accepting delegation C proposes. I will ignore this knife-edge condition which is uninteresting.

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Figure 2.2: GATT bargaining model

$t = 0$

$t = 1$

At the $t=0$ node, C proposes x_C^t. D can Reject or Accept, yielding $\left(\frac{x_C^t}{1-\delta}, \frac{1-x_C^t}{1-\delta}\right)$.

At $t=1$, D proposes x_D^t. C can Reject, Accept $\left(\frac{1-x_D^t}{1-\delta}, \frac{x_D^t}{1-\delta}\right)$, or Delegate. If Delegate, D can Reject $\left(0, \frac{1}{1-\delta}\right)$ or Accept $\left(\frac{(1-a)\theta - C_C}{1-\delta}, \frac{1-(1-a)\theta)(1+b)-C_D}{1-\delta}\right)$.
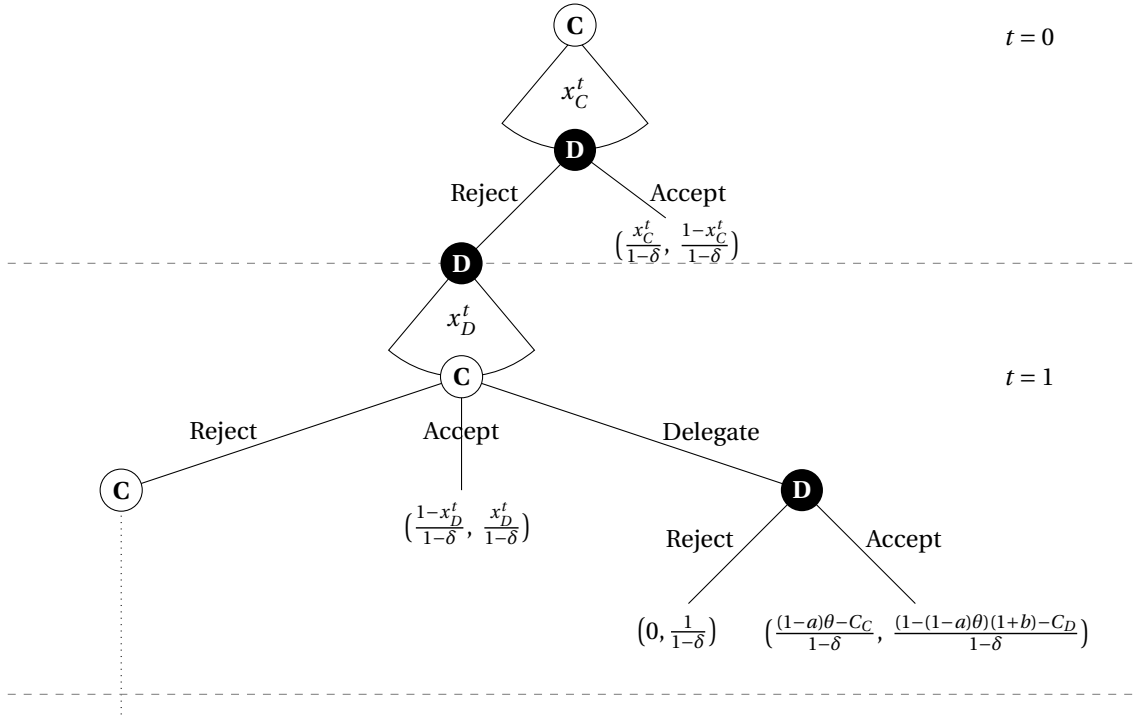
rejects any $x_C \geq 0$, and accepts if C chooses to delegate. Whenever C proposes, she offers $x_C \geq 0$, accepts $x_D \leq 1 - (1-a)\theta + C_C$, and chooses to delegate (rather than reject) if $x_D > 1 - (1-a)\theta + C_C$. Bargaining ends up with delegation taking place.

Under the GATT, the primary factor as to whether C has any bargaining leverage in equilibrium is whether or not b is high enough that D would accept delegation. If $b < b_{crit}$, then D would reject delegation and hence C has no bargaining leverage, and in equilibrium D keeps the entire pie and C gets nothing (case (i) in Proposition 2), just as in the bilateral bargaining model.

If $b > b_{crit}$ and hence D would accept delegation, then whether or not C has any bargaining leverage depends on whether or not $(1-a)\theta > C_C$, C's probability of winning the dispute in delegation exceeds her cost of litigation, holds. If not (case (ii) in Proposition 2), then C has no bargaining leverage and in equilibrium D keeps the entire pie and C gets

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nothing, just as in the bilateral bargaining model. But if it does (case (iii) in Proposition 2), then in equilibrium delegation occurs with C getting a strictly positive expected payoff of $(1-a)\theta - C_C$.

Thus, under the GATT C has bargaining leverage if and only if $b > b_{crit}$ and $(1-a)\theta > C_C$ both hold: b is high enough that D would accept delegation, and C's probability of winning the dispute exceeds her cost of litigation. But note that b_{crit} is strictly increasing in C's probability of winning $(1-a)\theta$, meaning that $b > b_{crit}$ is less likely to hold as C's probability of winning increases. Thus, both conditions are unlikely to be satisfied simultaneously, suggesting that complainants are unlikely to have much bargaining leverage under the GATT. Note that b_{crit} is also strictly increasing in D's litigation cost C_D, meaning that D is less likely to accept delegation as his litigation cost increases. Somewhat counter-intuitively, C is more likely to have bargaining leverage as D's cost of litigation decreases (as then D is more likely to accept delegation). Under the GATT, complainants benefit when costs of litigation are low (for both sides). Finally, note that the other crucial condition for C to have bargaining leverage under the GATT, $(1-a)\theta > C_C$, is more likely to hold as (1) the DSM's bias in D's favor decreases, (2) C's case becomes stronger, and (3) C's cost of litigation decreases.

This suggests that the dispute resolution system under the GATT fails to come to grips with the fundamental problems affecting the unequal distribution of economic power and wealth. Thus, the results indicate that international adjudication alone fails to function as an effective means for weak complainants to insulate themselves from power politics. If not the sheer existence of international arbitration, what makes international arbitration effective?

To answer this question, I now consider bargaining under the WTO DSM. What differentiates WTO bargaining from GATT bargaining is whether D is able to respond to C's decision of delegation. While the GATT allows D to reject if C chooses delegation, the WTO prevents D from blocking delegation, which allows C to unilaterally trigger delegation to third-party

adjudication. Figure 2.3 displays a game tree of the WTO bargaining model. Proposition 3 characterizes the no-delay SPE of the WTO bargaining game.

Figure 2.3: WTO bargaining model
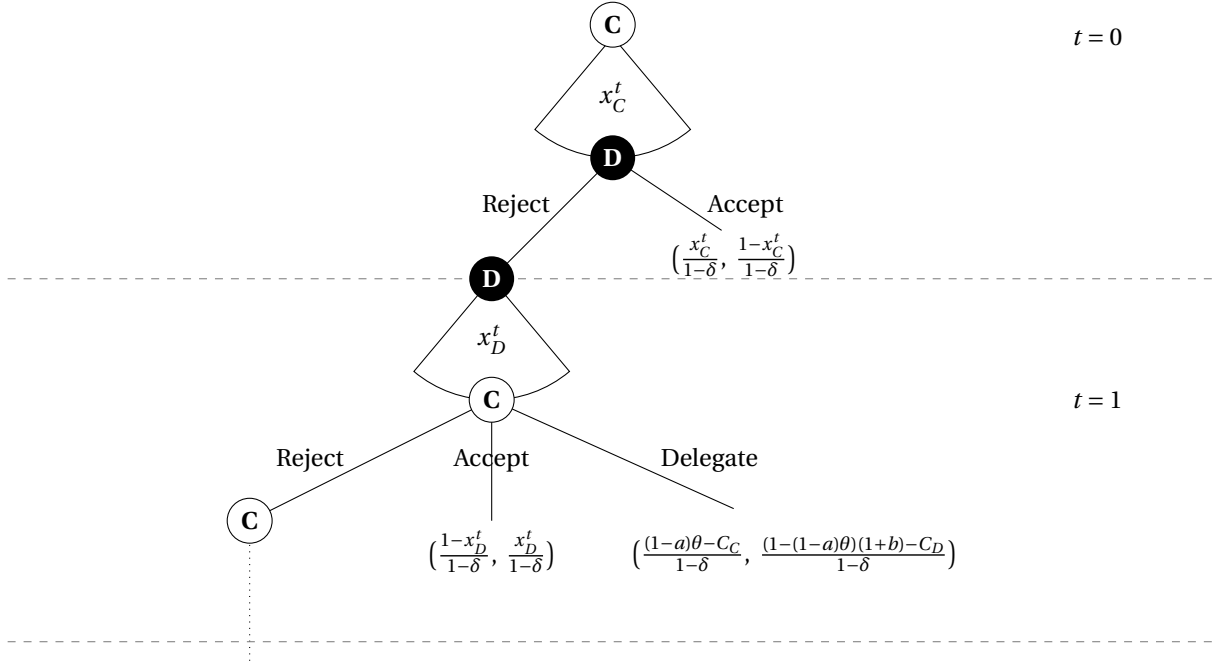
Proposition 3 (WTO EQ)**.** *Define the following threshold:* $b'_{crit} \equiv \frac{C_C + C_D}{1 - (1-a)\theta}$. *Then the following is the subgame-perfect equilibrium (SPE) of the WTO-bargaining game.*

(i) *If* $(1-a)\theta < C_C$, $\forall b$ (> 0) *whenever D proposes, he offers* $x_D = 1$ *and accepts* $x_C = 0$. *Whenever C proposes, she offers* $x_C = 0$ *and accepts any offer* $x_D \leq 1$. *Thus, bargaining ends immediately with a split* $(0, 1)$.

(ii) *If* $(1-a)\theta > C_C$, *for* $b < b'_{crit}$ *whenever D proposes, he offers* $x_D = 1 - (1-a)\theta + C_C$, *accepts* $x_C \leq \delta[(1-a)\theta - C_C]$, *and rejects otherwise. Whenever C proposes, she offers* $x_C = \delta[(1-a)\theta - C_C]$, *accepts* $x_D \leq 1 - (1-a)\theta + C_C$, *and delegates (rather than rejects) otherwise. Thus, bargaining ends immediately with a split* $\left((1-a)\theta - C_C, 1 - (1-a)\theta + C_C\right)$.

(iii) *If* $(1-a)\theta > C_C$, *for* $b > b'_{crit}$ *whenever D proposes, he offers* $x_D > 1 - (1-a)\theta + C_C$, *accepts* $x_C \leq \delta[(1-a)\theta(1+b) + C_D - b]$, *and rejects otherwise. Whenever C proposes, she offers* $x_C > \delta[(1-a)\theta(1+b) + C_D - b]$, *accepts* $x_D \leq 1 - (1-a)\theta + C_C$, *and delegates (rather than reject) otherwise. Bargaining ends up with delegation taking place.*

Under the WTO, because D cannot block delegation, whether or not $b > b_{crit}$ is no longer relevant. Now, whether or not C has bargaining leverage simply depends on whether or not $(1-a)\theta > C_C$, C's probability of winning the dispute in delegation exceeds her cost of litigation, holds. If this condition does not hold, then C's expected payoff for delegation is negative, and she would never choose delegation. Thus, she has no bargaining leverage. In equilibrium D keeps the entire pie and C gets nothing (case (i) in Proposition 3), just as in the bilateral bargaining model.

If $(1-a)\theta > C_C$ holds, then C chooses delegation if D's proposal is unacceptable. The equilibrium outcome depends on whether or not $b < b'_{crit}$ holds (incidentally, note that $b'_{crit} < b_{crit}$), but in either case C has a positive expected payoff, and hence benefits relative to the bilateral bargaining game. If $b < b'_{crit}$ holds, then D prefers to make an acceptable proposal rather than allowing delegation to occur, and proposes $x_D^* = 1 - [(1-a)\theta - C_C]$ for himself, which is less than the entire pie. C accepts this proposal (case (ii) in Proposition 3). The threat of delegating causes D to make an acceptable proposal that gives C some of the pie, and delegation does not actually occur.

As for comparative statics, C's equilibrium share $1 - x_D^* = (1-a)\theta - C_C$ is (1) strictly increasing in the strength of her case (θ), (2) strictly decreasing in the DSM's degree of bias towards D (a), and (3) strictly decreasing in her cost of litigation (C_C).

Finally, if $(1-a)\theta > C_C$ and $b > b'_{crit}$, then D prefers to allow delegation to occur rather than propose what C is demanding, and hence makes an unacceptable proposal, triggering delegation (case (iii) in Proposition 3). C thus gets her expected payoff for delegation $(1 -$

$a)\theta - C_C$, which is positive (and in particular, C gets the entire pie with positive probability).

The same comparative statics as in case (ii) apply, because C's expected payoff is the same either way. This raises an important point, in that when D makes an acceptable proposal (case (ii)), he just offers C her expected payoff for delegation, and hence her cost of litigation still factors into her payoff.

When $(1 - a)\theta > C_C$ holds, then delegation occurs if $b > b'_{crit}$. Thus, any factor that increases b'_{crit} decreases the likelihood of delegation occurring. Note that b'_{crit} is (1) strictly increasing in C's cost of litigation (C_C), (2) strictly increasing in D's cost of litigation (C_D), (3) strictly increasing in the strength of C's case (θ), and (4) strictly decreasing in the DSM's degree of bias towards D (a). These last two comparative statics can alternatively be stated as (5) b'_{crit} is strictly increasing in C's probability of winning in delegation ($(1 - a)\theta$).

High costs of litigation on either side decrease the likelihood of delegation occurring. The stronger C's case, the less likely delegation is to occur. This implies a possible selection effect: empirically, the sample of delegation instances may exhibit unusually weak complainant cases, because when the complainant's case is strong the defendant would rather make an acceptable proposal in bilateral bargaining. Hence, any empirically estimated complainant success rate in delegation may be underestimating the "true" rate, in that strong cases tend to be settled through bilateral bargaining and do not even go to delegation.[38] This selection effect is reinforced by comparative statics (4) and (5): when the complainant is likely to win through the DSM being unbiased, delegation is less likely to occur.

The major contrast between the GATT and the WTO is that complainants only benefit over private bargaining under the GATT if $b > b_{crit}$ and $(1 - a)\theta > C_C$ both hold, whereas benefiting under the WTO only requires the latter. That is, in turn, neither WTO nor GATT is

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[38]This is similar to Smith's (1996) argument that estimating alliance reliability using a sample in which the alliance is actually invoked may be underestimating the true reliability rate, in that reliable alliances are unlikely to actually be invoked. Only unreliable alliances tend to be challenged.

Figure 2.4: Settlements in equilibrium (GATT vs. WTO)

(a) Small benefits from arbitration, $b < b_{crit}$

(b) Large benefits from arbitration, $b > b_{crit}$
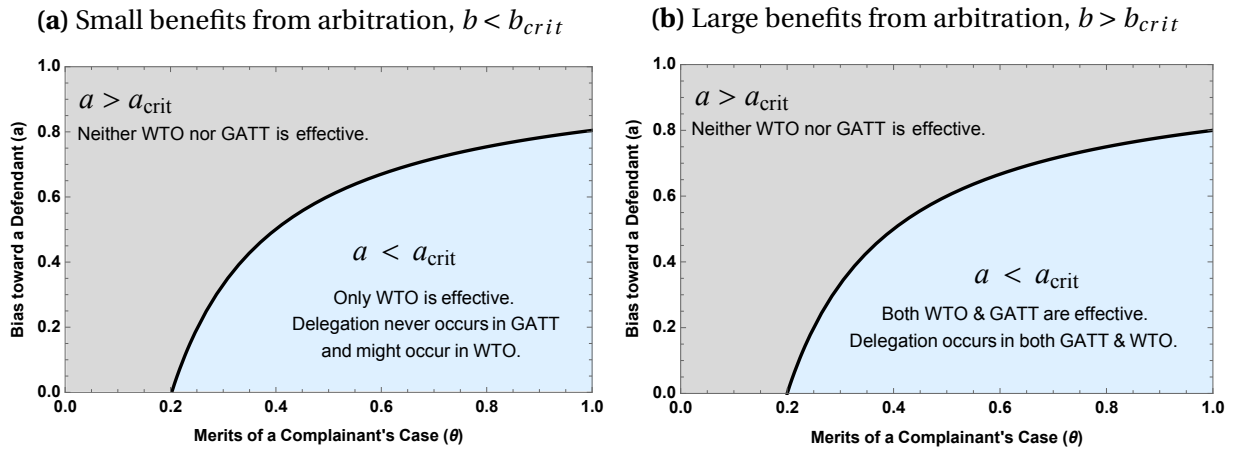
Note: Under the WTO, C's equilibrium payoff is $\frac{(1-a)\theta - C_C}{1-\delta_C}$ in the bottom region and 0 in the top region. C's equilibrium payoff is always 0 under the GATT and private negotiations. Delegation occurs in the WTO if $b > b'_{crit}$.

Note: Under both the WTO and the GATT, C's equilibrium payoff is $\frac{(1-a)\theta - C_C}{1-\delta_C}$ in the bottom region and 0 in the top region. C's equilibrium payoff is always 0 under private negotiations.

effective in providing a more level playing field if $(1-a)\theta < C_C$. Define the following threshold: $a_{crit} \equiv 1 - \frac{C_C}{\theta}$. Then, $a > a_{crit}$ is equivalent to $(1-a)\theta < C_C$. Thus, when arbitration is substantially biased toward D such that $a > a_{crit}$ (as shown in the top region of Figures 2.4a and 2.4b), C is just as well off in the GATT or the WTO as she would be in private bargaining. This suggests that fair adjudication is necessary for the GATT/WTO DSM to allow weak complainants to insulate themselves from power politics.

When the arbitration is substantially fair such that $a < a_{crit}$ (as shown in the bottom region of Figures 2.4a and 2.4b), the effectiveness of the WTO or the GATT depends on the extent to which international arbitration is beneficial to a defendant (b). When $b < b_{crit}$ (Figure 2.4a) and $a < a_{crit}$, C is just as well off in the GATT as she would be in private bargaining. International arbitration of the GATT fails to generate additional benefits enough to prevent D from blocking delegation (the bottom region of Figure 2.4a). Under the WTO, by contrast, weak complainants are better off than private negotiations by either (i) pre-trial

settlements during consultations or (ii) international arbitration. Note $b'_{crit} < b_{crit}$ when $a < a_{crit}$.[39] When $b < b'_{crit}$, international arbitration of the WTO functions as a threat by which weak complainants could elicit a more favorable offer from their powerful counterparts before the panel stage. When $b'_{crit} < b < b_{crit}$, weak complainants receive more favorable settlements from international arbitration of the WTO.

When $b > b_{crit}$ (Figure 2.4b) and $a < a_{crit}$, both the GATT and the WTO are effective because bargaining winds up resulting in international arbitration from which C receives a more favorable offer than private negotiations (the bottom region of Figure 2.4b). D optimally makes an offer which C would rather choose to delegate, and international arbitration will take place in both the GATT and the WTO. The results also indicate that the GATT is effective in leveling the playing field only when delegation occurs, whereas the WTO is effective even without going through the costly process of litigation. Thus, the model predicts that defendants being unable to block delegation under the WTO leads to much more concessions in trade disputes under the WTO than under the GATT.

It is worth noting that delegation can occur in equilibrium even under complete information. This is noteworthy because I have modeled delegation analogously to the "costly lottery" interpretation of war in game-theoretic models of crisis bargaining, in which war never occurs under complete information assuming no issue indivisibility or commitment problems (Fearon, 1995; Powell, 1996). That is, it is a costly lottery over who wins the entire pie. The difference is that I have stipulated an additional benefit $b > 0$ that the defendant gets for winning the dispute, and if this benefit is large enough, delegation can occur even under complete information. However, empirically the benefit is unlikely to be large enough, and hence case (ii) is more likely to occur than case (iii): under complete information, concessions likely occur through bargaining rather than delegation. For the parameters of case (ii), a

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[39]Recall that $b'_{crit} \equiv \frac{C_C + C_D}{1-(1-a)\theta}$ and $b_{crit} \equiv \frac{C_D + (1-a)\theta}{1-(1-a)\theta}$. If $C_C < (1-a)\theta$, $b'_{crit} < b_{crit}$. That is, if $a < a_{crit}$, $b'_{crit} < b_{crit}$ where $a_{crit} \equiv 1 - \frac{C_C}{\theta}$.

simple informational model can be constructed in which D is uncertain of the strength of C's case θ and for certain priors makes a risky proposal that only the weak-case type accepts. This provides an informational rationale for costly delegation occurring, analogous to the informational explanation for costly war occurring.

2.5 Conclusion

Does legalization of international institutions mitigate or magnify power asymmetries? I answer this question in the context of the transition of dispute settlement mechanisms from the General Agreements on Tariffs and Trade (GATT) to the World Trade Organization (WTO). I argue that the more legalized institutional features of the WTO — the unilateral right to a panel and the automatic adoption of a ruling — empower complainants. Due to the increased bargaining leverage, concessions are more likely to occur under the WTO than the GATT.

Building on Rubinstein's alternating offer bargaining model, I develop a game theoretic model of trade disputes and examine three different scenarios: private bargaining, GATT bargaining, and WTO bargaining. In the baseline model of private bargaining, I find that a complainant with no bargaining leverage gets nothing in equilibrium. I find that a complainant benefits from GATT bargaining relative to private bargaining only if delegation occurs, while benefiting under the WTO does not require delegation to occur. Also, in the GATT bargaining model, a complainant has bargaining leverage when (1) a defendant gets a substantial amount of an additional benefit from winning the case through delegation, and (2) a complainant's chance of winning the dispute through delegation exceeds her cost of litigation. Given that those conditions are unlikely to be satisfied simultaneously, this suggests that a complainant is unlikely to have bargaining leverage under the GATT. In the WTO bargaining model, however, a complainant benefits more than in private bargaining only if a complainant's chance of winning the dispute through delegation exceeds her cost of litigation. Thus, the WTO bargaining model predicts that defendants being unable to block

delegation leads to more concessions in trade disputes under the WTO than under the GATT. This suggests that the WTO is more effective than the GATT in providing a level playing field.

The model also predicts that delegation is more likely to occur under the WTO than the GATT, which is consistent with previous empirical findings. Additionally, the majority of disputes brought to the GATT/WTO end in early settlement without delegation occurring. Note that in both the GATT and the WTO, delegation occurs only if the following two conditions are satisfied: (1) a defendant receives a substantial amount of an additional benefit from winning the case through delegation, and (2) a complainant's chance of winning the dispute through delegation exceeds her cost of litigation. Thus, the empirical finding about the high rate of early settlement suggests that in both the GATT and the WTO (1) the complainant's probability of winning rarely exceeds her cost of litigation, (2) a defendant is unlikely to get a substantial amount of additional benefit from winning the case through delegation, or (3) both conditions are unlikely to be satisfied simultaneously.[40]

My research suggests significant implications for our understanding of the role of legalization in the international relations literature. A series of bargaining models over trade disputes shows that the sheer existence of international arbitrators alone fails to function as an effective means of threat. The legal teeth of the WTO are more likely to mitigate power asymmetries than the GATT. Specific and firm rules supported by fair international adjudication are necessary to allow complainants to insulate themselves from power politics. These results should not undermine the importance, in the pursuit of international cooperation, of seeking to strengthen international organizations. Despite the apparent constraints on the role of international organizations, these results suggest that legalization can offer a voice to less powerful states, thereby improving the distribution of power and gains from cooperation.

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[40]Note that for the WTO disputes, (1) is the only relevant condition.

3.   AN EMPIRICAL ANALYSIS OF DELEGATION AND SETTLEMENT AT THE GATT VS. THE

WTO, 1980-2018

3.1   Introduction

Why do countries agree to international adjudication to resolve their disputes? Large and rich

countries can exercise power and extract the best possible outcomes in bilateral negotiations.

Making dispute settlement formal and public limits their use of power in pushing for the

preferred outcomes. Nevertheless, the legalized system benefits the stability of the trade

regime, by providing public goods (e.g. Gilpin, 1981) and lowering transaction costs (e.g. Keo-

hane, 1984). Recent studies of World Trade Organization (WTO) adjudication also show that

powerful countries have alternative means of exercising power in WTO dispute settlement

such as high cost of litigation (e.g. Kim, 2008) and influence over jurisprudence (e.g. Daku

and Pelc, 2017). Despite the negative consequences for the interests of powerful countries,

the current trend of increased legalization of international institutions has continued.

The highly legalized and judicialized dispute settlement mechanism of the WTO is one

of the most promising features of the transition from the General Agreement on Tariffs and

Trade (GATT) to the WTO in 1995. For instance, countries can no longer wield a veto in the

new system and hence, small and poor countries are able to bring more disputes against

more powerful countries. Despite the criticisms of increased legalization of international

institutions (e.g. Goldstein and Martin, 2000; Kim, 2008),[1] the large literature on international

adjudication shows the effectiveness of the newly upgraded dispute resolution mechanism

(e.g. Davis, 2012; Rosendorff, 2005). This paper asks: Does the WTO's legalized dispute

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[1]Goldstein and Martin (2000) call legalizing international institutions "a tricky business" (605). Daku and Pelc (2017) suggest that power can still play in the WTO dispute settlement "in nuanced ways, and at the margins" by influencing the content of rulings, rather than who files or wins disputes (254).

settlement mechanism provide a more level playing field? I argue in the affirmative: the enhanced legal features of the WTO's dispute settlement mechanism - particularly the precise, elaborated, and binding rules and timelines- provide bargaining leverage for small and poor countries so that they have fared better than under the GATT.

I develop a theory about litigation[2] and third party participation to explain how increased legalization in international trade regime empowers small and poor countries. Disputes filed in the WTO are more likely to reach litigation than those filed in the GATT. The odds of litigation also increase in the number of third parties involved because defendants are more likely to find winning the case in litigation beneficial. I further develop a theory about a conditional effect of WTO dispute settlement on trade flows between disputants after disputes end. Specifically, the WTO's legalized dispute settlement helps smaller economies (complainants, in particular) disproportionally. As a result, poorer countries continue to promote trade of affected products after WTO disputes more than they could do after GATT disputes, while richer countries are unlikely to do so.

I test the implications of my theory using an original data set on disputes at the GATT and the WTO from 1980 to 2018 and an original data set on post-dispute trade flows for each GATT/WTO dispute filed between 1989 and 2015. Empirical evidence supports my argument that the more legalized system of dispute settlement provides a more level playing field for small and poor countries by providing bargaining leverage for them to gain more from disputes with their more powerful counterparts.

This study contributes to the literature on GATT/WTO dispute settlement and legalization of international institutions, and also speaks to a broader literature on the effectiveness of international institutions. In particular, the study highlights how legalized dispute settlement and third party participation shape states' choices regarding litigation and why poor

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[2]The literature interchangeably uses the terms *litigation* and *delegation* (e.g. Gray and Potter, 2020; Johns, 2012). I will also interchangeably use those terms in this chapter.

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complainants gain more from the legalized dispute settlement mechanism of the WTO than the less-legalized mechanism of the GATT. I find support for my argument that cases filed in the WTO are more likely to reach litigation than those filed in the GATT, and that litigation is more likely to occur as the number of third parties increases.

I also find support for my argument that the effect of legalized WTO dispute settlement mechanism will vary by the complainant's market power, and specifically that WTO dispute has a positive effect on post-dispute trade flows of affected products between disputants for poorer complainants, but this effect becomes less positive as they become richer. Overall, the evidence suggests that the effectiveness of international institutions depends on the legal attributes of international adjudication and power imbalances, rather than the existence of the legal framework per se.

3.2 Theory

How does the legal design of dispute settlement systems in the multilateral trading system relate to the outcomes of trade disputes? In this chapter, I test three main empirical expectations derived from the theory presented in Chapter 2. First, delegation is more likely to occur in the more legalized system of dispute resolution. Put simply, WTO disputes are more likely to reach a panel ruling relative to GATT disputes. Second, the odds of litigation are strictly increasing in the number of third parties. The more the third parties involved, the more likely the dispute ends up with litigation. Lastly, the gains in a complainant's payoff from WTO disputes relative to that from GATT disputes are increasing in the degree of her market power. The poorer the complainant, the more her post-dispute trade gains after the dispute ends in the WTO relative to the GATT. I flesh out these implications of the theory in turn.

My model presented in the previous chapter clearly shows that litigation as well as gains in the complainant's payoff of international arbitration are able to occur if the complainant's

probability of winning exceeds her cost of litigation. If the complainant's cost of litigation exceeds her probability of winning the case, she would never choose to delegate authority to international institutions because her expected payoff from litigation is negative. Conversely, if the condition is satisfied, the complainant prefers litigation and makes an unacceptable offer to the defendant in both GATT and WTO disputes.

The model demonstrates that GATT adjudication gives the complainant who prefers litigation bargaining leverage if the additional benefit from winning the case incentivizes her counterpart to accept delegation. The underlying logic is that litigation would never occur without the defendant's agreement under the GATT. The model predicts that the defendant accepts delegating power to third-party adjudication if the additional benefit is large s.t. $b > b_{GATT}$.[3] Under the WTO, however, the complainant can unilaterally trigger delegation to the legal bodies. If the additional benefit is small s.t. $b < b_{WTO}$, threat of litigation makes the defendant offer a generous proposal which the complainant would accept. If the additional benefit is large s.t. $b > b_{WTO}$, the defendant optimally makes an offer which the complainant would rather choose to delegate. Consequently, litigation will take place.

The model demonstrates that the odds of litigation are higher for WTO disputes than the GATT disputes. The underlying logic is that the threshold for disputants to resort to adjudication under GATT is higher than that under the WTO, i.e., $b_{GATT} > b_{WTO}$. These results are shown in Figure 3.1. In both regions of (B) and (C) in Figure 3.1, disputants resort to litigation under the WTO, but they only do so in region (C) under the GATT.

Under this logic, the decision about whether to litigate should be correlated with the amount of additional benefit the defendant would gain by winning a case in public. Recall the primary condition for litigation to take place is $(1 - a)\theta > C_C$. The choice of litigation should be also correlated with the relative size of the probability of winning, $(1 - a)\theta$, and

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[3] In this chapter, I use intuitive terms b_{GATT} and b_{WTO} for b_{crit} and b'_{crit}, respectively.

Figure 3.1: Theoretical relationship between dispute settlement systems and litigation
(Complainant's probability of winning > Cost of litigation)
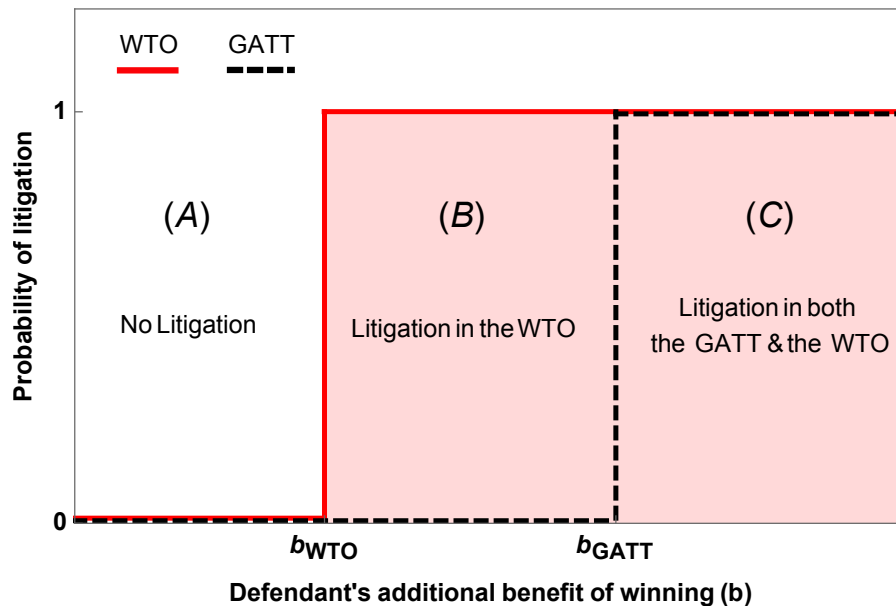
the cost of litigation for the weaker complainant, C_C. For testing empirical expectations, I implicitly assume that such condition is met to draw simple hypotheses (Hypotheses 1, 2, and 3). This leads to the first hypothesis.

Hypothesis 1. *All else equal, cases that were filed in the WTO are more likely to reach litigation than cases that were filed in the GATT.*

The probability of litigation increases as the defendant's additional benefit of winning the dispute increases. There are various sources of the additional benefit. As I noted earlier, this could come from the gains from setting a precedent for other related issues in the multilateral trade regime given that there is a prestige benefit of having international courts endorse a state's position in the dispute. Public rulings have important implications for future jurisprudence. From the perspective of compliance rates, publicity of panel rulings also ties the hands of leaders to respect rulings despite domestic pressure for protection. Publicity of panel rulings is even more important when there are many third parties. Third-party

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participation is a signal of the importance and the sensitivity of the issue. For more important and sensitive issues with more related parties, the defendant will expect a long-lasting impact of the legal decision on future jurisprudence and practice of dispute settlement (Kucik and Pelc, 2016). Thus, the more third parties, the more the additional benefit in prevailing in the case. Taken together, this logic leads to the second hypothesis. This hypothesis echoes a similar argument made in Kucik and Pelc (2016) who find third-party participation increases the likelihood of litigation.[4]

Hypothesis 2. *All else equal, the likelihood of litigation increases in the number of third parties.*

The model also demonstrates that concessions are more likely to occur under the WTO than the GATT due to the complainant's increased bargaining leverage. The complainant is likely to gain more from WTO disputes than GATT disputes.[5] How does the difference in dispute outcomes relate to the absolute power of the weak player, the complainant?

In the model, power disparity between disputing parties is captured by the level of bias in GATT/WTO adjudication. For the sake of simplicity, the model does not differentiate the level of institutional bias, $a \in (0, 1)$, between the GATT and the WTO. However, when we consider that GATT adjudication is more power-based than WTO adjudication, the institutional bias of the GATT should be greater than that of the WTO, i.e., $a_{GATT} > a_{WTO}$.

For more simplicity, the model uses a common discount factor, $\delta \in (0, 1)$, by which both players discount their future payoffs. Consider the nature of a discount factor. The lower the discount factor (i.e. the higher the discount rate) the greater the preference for immediate reward over delayed rewards. In the context of trade disputes of which the goal

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[4]IR scholars disagree about the effect of third party participation on GATT/WTO dispute settlement (e.g. Bown, 2005; Busch, Reinhardt, and Shaffer, 2009).

[5]To reiterate the primary condition for this, the complainant should prefer litigation such that her chance of winning a dispute is greater than her cost of litigation.

is to lift the alleged trade barriers and promote freer trade flows, larger economies are more patient than smaller economies in terms of future payoffs (i.e. trade flows). As a result, larger economies discount future payoffs less than smaller economies do. Put differently, the greater the complainant's market power the higher her discount factor δ_C.

To uncover an important relationship between the effectiveness of international institutions and states' power, I take such variation into account and evaluate how the effect of dispute settlement mechanism on settlement outcomes will vary depending on the complainant's market power.[6] Suppose the complainant prefers litigation such that her chance of winning exceeds the cost of litigation.[7] Then the model predicts that the complainant's equilibrium payoff is always $\frac{(1-a_{WTO})\theta-C_C}{1-\delta_C}$ under the WTO. Under the GATT adjudication, however, the complainant's payoff depends on whether the defendant would accept or reject delegation. Her payoff is either $\frac{(1-a_{GATT})\theta-C_C}{1-\delta_C}$ or 0 depending on whether the defendant's additional benefit of prevailing in a case is sufficient for him to accept delegation. If $b < b_{GATT}$ (small b), the complainant would get 0 under the GATT but under the WTO, $\frac{(1-a_{WTO})\theta-C_C}{1-\delta_C}$ which is strictly greater than 0[8]; the complainant is strictly better in the WTO than the GATT. If $b > b_{GATT}$ (large b), the weaker complainant still fares better in the WTO than the GATT given that the GATT is more biased toward the powerful defendant than the WTO, $a_{GATT} > a_{WTO}$. That is, $\frac{(1-a_{WTO})\theta-C_C}{1-\delta_C} > \frac{(1-a_{GATT})\theta-C_C}{1-\delta_C}$. This relationship by the complainant's market power δ_C is shown in Figure 3.2.

In disputes filed by poorer complainants, there is a significant relationship between their payoffs and the type of international arbitration. For disputes filed by rich complainants, however, their payoffs from WTO disputes do not appear significantly likely to be greater than

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[6]The main findings hold when the model takes into account such variation in the relevant parameters.

[7]If the condition is not satisfied, the complainant would never choose litigation. As a result, international institutions fail to generate bargaining leverage for the weak complainant.

[8]As I mentioned earlier, I implicitly assume that the primary condition for litigation to take place (i.e., $(1-a)\theta > C_C$) is met. If $(1-a)\theta > C_C$, then $\frac{(1-a)\theta-C_C}{1-\delta_C} > 0$.

Figure 3.2: Theoretical relationship between dispute settlement systems and complainant's payoff (Complainant's probability of winning > Cost of litigation)
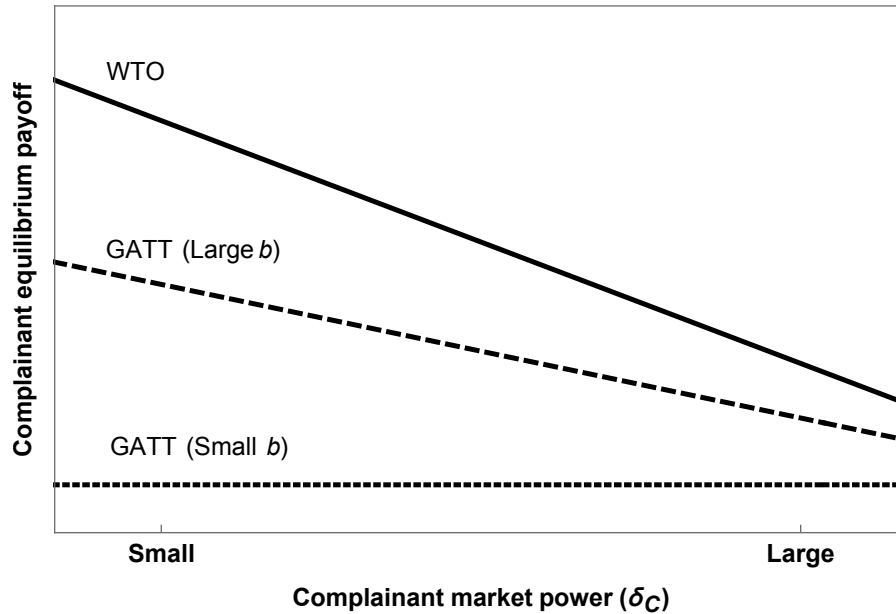
their payoffs from GATT disputes. Put simply, if the WTO's legalized dispute settlement helps poorer complainants disproportionally, poorer complainants continue to promote trade of affected products after WTO disputes more than they could do after GATT disputes, while richer complainants are unlikely to do so. This conditional effect leads to the third hypothesis.

Hypothesis 3. *All else equal, the poorer complainant is more likely to export the affected products to the defendant after the dispute ends in the WTO than the GATT, but this positive impact will become less positive and insignificant as the complainant becomes richer.*

3.3 Empirics

I test those hypotheses on a data set of all available GATT and WTO disputes since 1980. I utilize two data sets because the different empirical implications imply different units of analysis. For the tests of Hypotheses 1 and 2, my first data set is built at the dispute level

and considers disputes with the less powerful complainant than the counterpart among all GATT/WTO disputes between 1980 and 2018. For testing Hypothesis 3, my second data set is built at the dispute-country dyad-year level and includes one observation of a given year for each pair of disputing countries for every GATT/WTO dispute. To do so, I construct a new database containing trade flows for each GATT/WTO dispute between 1989 and 2015 (65 GATT disputes and WTO disputes from DS1 to DS498 with specific disputed products).[9]

According to Hypothesis 3, the WTO's legalized dispute settlement system helps smaller economies (complainants, in particular) disproportionally. If we observe this conditional effect, the gains from cooperation are more evenly distributed among income groups in the WTO relative to the GATT. To test this, I use trade volumes on the affected products listed in the dispute, considering fewer imports or more exports as favorable outcomes from the perspective of a complainant. Several innovative studies test the effect of the WTO's dispute settlement mechanism with trade flows (e.g. Kucik and Pelc, 2016). Peritz (2020) calls trade flows "a measurable indicator of *de facto* compliance" (221). Yet, Kucik (2019) notes a limitation: "trade flows are only a loose proxy for the payoffs from early settlement. Since the terms of early settlements are sealed by design, it is impossible to observe the precise nature of the deal. As a result, it is not possible to reliably measure exactly how much a complainant gets from settlement versus a ruling" (1124-5).

3.4 Variables

3.4.1 Dependent Variable

To test Hypotheses 1 and 2, I examine which cases reach the panel stage at three levels: panel establishment, circulation of panel report, and adoption of panel report. My sample consists

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[9]It does not include disputes over services (e.g. DS204 on regulatory measures affecting telecommunications services into and within Mexico) or broader policies (e.g. DS471 on the use of certain anti-dumping methodologies used by the US in anti-dumping proceedings involving China).

of 180 GATT disputes[10] and 574 WTO disputes (from DS1 to DS 574). It covers all disputes initiated through the official filing from January 1, 1980, until December 31, 2018, but does not include the most recent 21 disputes (from DS575 to DS 595, as of June 2020). The dependent variable, *Ruling circulated*, is 1 if the case ends with panel ruling; 0 otherwise. Alternatively, I use *Ruling adopted* as a dependent variable which is 1 if the case ends with panel ruling and its adoption by disputing parties; 0 otherwise. I also use *Panel established* as another dependent variable which is 1 if the case ends with establishment, regardless of panel reports.

To test Hypothesis 3, I analyze trade flows between disputing countries after disputes end. The dependent variable, *Post-dispute imports*, is the annual volume of imports into defendants from each complainant over the five-year period after a dispute ends. To construct the measure, I collect annual bilateral trade data for each product listed in GATT/WTO disputes.[11] Then I aggregate these data over a given dispute following Kucik and Pelc (2016) and Peritz (2020), given that there is a wide variation in the number of products across disputes.[12]

For each dispute, I identify the disputed products and examine trade flows of those products at various levels of Harmonized System Codes.[13] Depending on the level of precision available, I use either 2- (e.g. DS348 on textile and footwear products), 4- (e.g. DS464 on residential washers), or 6-digit (e.g. DS480 on biodiesel) HS codes. It is built from the complainant's annual exports of those disputed products to the defendant in five years after the dispute ends. Product-level trade data are from the UN Commodity Trade Statistics Database (UN Comtrade).[14] Because the distribution is highly skewed, I take the natural

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[10]A list of GATT disputes is consistent with the data provided by Hudec (1999). Data are from the WTO's collection of GATT disputes and are available at `https://www.wto.org/`.

[11]For the WTO disputes, I revise and expand the dispute settlement database developed by Horn and Mavroidis (2008) which covers 351 WTO disputes initiated between 1995 and 2006.

[12]Kucik and Pelc (2016) note that the heterogeneous impact of a dispute on trade flows across the products is highly suspect (874).

[13]To my knowledge, no study of GATT/WTO dispute settlement has done this on GATT disputes rather than WTO disputes.

[14]Data available at `https://comtrade.un.org/`. For a dispute involving the EU, I aggregate trade data

logarithm of this variable. My data set includes imports data when there is a complete record of both prior- and post-dispute (for five years)[15] to avoid the impact of artificial changes in trade data as a result of missing values.[16] As a result, I systematically exclude ongoing cases or cases abandoned. Put differently, I only include cases which end up with either a mutually agreed solution (MAS), ruling (a.k.a. panel report), or withdrawal. My sample consists of GATT disputes filed since 1989 and WTO disputes ranging from DS1 to DS449.

3.4.2 Independent Variables

To test the effectiveness of the WTO's dispute settlement mechanism (Hypothesis 1), the main independent variable is the presence of the WTO's dispute settlement mechanism. *WTO* is coded 1 for the WTO period, and 0 otherwise. To test Hypothesis 2, I use the number of third parties in a given dispute as the main independent variable to capture the size of additional benefit the defendant gains from winning a case in litigation.

To test Hypothesis 3, the key independent variable is the presence of the WTO's dispute settlement mechanism as described above. The second independent variable is the complainant's market power in terms of GDP (in constant 2010 USD, logged). Among many sources of power, market power is the most relevant one in trade disputes (Davis, 2012). Power, political as well as military, is crucially dependent on the size of the economy, such that asymmetries in political power are highly correlated with size asymmetry (e.g. Gartzke, 2007; Hegre, 2008). Because the absolute size of the economy is highly correlated with markets and production capacities, which causes poorer countries not to be able to get what they want when filing disputes. As an alternative measure, in the appendix, I use GDP per capita (in constant 2010 USD, logged), one of the most frequently used measures of power in both

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over the EU member states in a given year. For example, I aggregate trade volume over 28 countries between 2013 and 2019 for the EU but 27 countries without Croatia, the latest member state, between 2007 and 2012.

[15]I also use the three-year window rather than five years. The findings are robust.

[16]This is consistent with the strategy of Kucik and Pelc (2016) which I largely follow the data construction in terms of imports flows over the affected products in a given dispute.

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the international conflict and political economy literature (e.g. Bown, 2005).

3.4.3 Control Variables

I include several control variables. For the dispute-level analysis (Hypotheses 1 and 2), I control for the effect of macroeconomic factors. I include the log of GDP (in constant 2010 USD), the log of per capita GDP (in constant 2010 USD), the log of per capita income (in constant 2010 USD), and the log of population size of both complainant and defendant. I use either overall GDP and per capita income or per capita GDP and population to properly control disputing parties' market power and level of economic development. These data are collected from the World Bank's World Development Indicators (WDI). I also use the *Polity* score as the measure of regime type of disputing countries (Marshall and Gurr, 2020).[17]

Similarly, for the dispute country-dyad analysis (Hypothesis 3), I first control for the effect of macroeconomic factors (i.e. the log of GDP and the log of per capita income) as well as Polity score. To further determine controls for the complainant, defendant, and dyad, I largely follow the specification of Kucik and Pelc (2016) who analyze the impact of WTO dispute settlement on dyadic trade flows after dispute ends.[18] As a result, the regression includes two additional variables. *Total imports* is the log of the defendant's total imports for all products from the complainant. This variable controls for the strength of economic ties over the (five-year) periods after dispute ends. In order to control for the starting level of trade between disputing parties, I also include the log of the defendant's imports of disputed products from the complainant in the year prior to the dispute, *Prior imports*. Summary statistics for all variables and a correlation matrix are included in the appendix.

[17]Polity5 data available from `http://www.systemicpeace.org/inscrdata.html`.

[18]Note that Kucik and Pelc (2016) examine the complainant's gains in trade flows relative to that of non-participating countries, rather than the complainant's absolute gains which I examine in this paper.

3.5 Results

3.5.1 Does the WTO dispute settlement increase the odds of litigation?

To test Hypotheses 1 and 2, I assess disputes brought under the GATT and the WTO between 1980 and 2018. I only include disputes for which the complainants are weaker than their counterparts in terms of market power. To show how international arbitration empowers a weak party, my models assume that a defendant is more powerful than a complainant, and he is willing to wield power to get away with violating agreements and not to lift alleged trade barriers. This yields a sample of 382 disputes (involving 108 GATT disputes and 274 WTO disputes).

I find strong evidence that the more legalized dispute resolution system under the WTO regime is correlated positively with litigation.[19] I present the probit regression results in Table 3.1 given the limited dependent variable. Models 1-2 ask which cases reach a ruling by looking at whether a panel report is issued. Model 3 looks at whether a panel report is issued and adopted. Model 4 asks which cases get a panel established regardless of a panel report being issued. Getting a panel established does not yet give the dispute publicity. Nevertheless, requesting a panel is a realistic threat to move disputes into the public and legalized realm. Thus, early settlements before and after a panel is established should be considered differently.

Table 3.1 confirms that weaker complainants are significantly more likely to reach a ruling in the WTO than the GATT. Across all models, the coefficients on the *WTO* variable are positive and statistically different from zero as hypothesized. Weaker complainants disproportionately fail to get a ruling issued under the GATT, compared with WTO adjudication.

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[19]Figure B.1 in appendix plots the pattern of GATT/WTO litigation between 1980 and 2017, showing the substantial increase in the number of cases which reach a ruling since 1995.

Table 3.1: Probit models of GATT/WTO disputes, 1980-2018

	Ruling circulated		Ruling adopted	Panel established
	Model 1	Model 2	Model 3	Model 4
WTO	0.473***	0.457***	0.560***	0.591***
	(0.152)	(0.151)	(0.160)	(0.154)
Complainant GDP (log)	0.032		0.100**	0.054
	(0.051)		(0.051)	(0.053)
Complainant income PC (log)	−0.005		−0.047	0.081
	(0.062)		(0.062)	(0.066)
Complainant GDPPC (log)		0.045		
		(0.065)		
Complainant population (log)		0.023		
		(0.049)		
Complainant polity	0.003	−0.002	0.003	−0.013
	(0.015)	(0.014)	(0.015)	(0.016)
Defendant GDP (log)	0.026		−0.012	−0.077
	(0.079)		(0.080)	(0.080)
Defendant income PC (log)	−0.038		−0.125	0.265**
	(0.132)		(0.134)	(0.131)
Defendant GDPPC (log)		−0.025		
		(0.108)		
Defendant population (log)		0.013		
		(0.079)		
Defendant polity	0.047*	0.054**	0.047*	0.015
	(0.025)	(0.024)	(0.025)	(0.024)
Intercept	−2.104	−1.725	−1.860	−2.837*
	(1.546)	(1.480)	(1.577)	(1.557)
Observations	382	387	382	382
BIC	560.95	567.32	536.47	535.81
Log likelihood	-256.69	-259.83	-244.45	-244.13
Pseudo R^2	0.03	0.03	0.04	0.06
Weaker complainants?	Yes	Yes	Yes	Yes

Note: Cluster robust standard errors in parentheses. In Models 1-2, the dependent variable is a panel report circulated in a dispute. In Model 3, the dependent variable is a panel report circulated and adopted in a dispute. In Model 4, the dependent variable is a panel established in a dispute. Models 1-4 look at disputes when the complainant is weaker than the defendant. The level of analysis is the dispute level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3.3: Litigation in the GATT vs. the WTO (Model 1, Table 3.1)
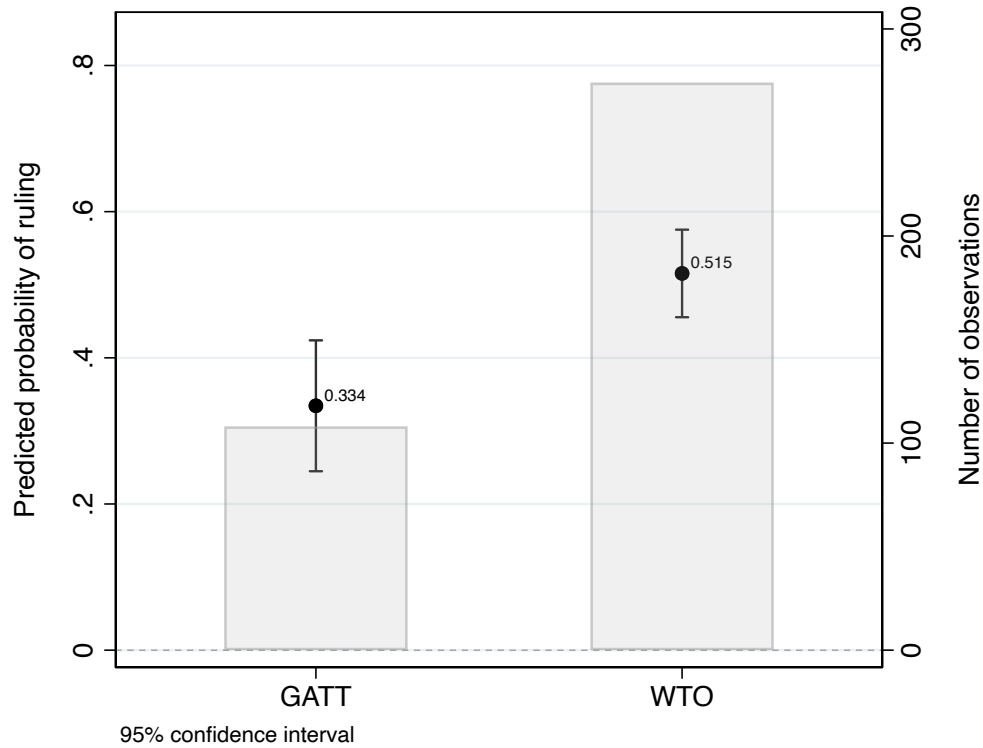
Note to Figure 3.3: This figure presents the predicted probabilities of ruling circulated (vertical axis) in the GATT and the WTO dispute settlement (horizontal axis). Using the estimates from Model 1 in Table 3.1, I calculated the predicted probabilties of ruling being circulated, holding covariates at the observed values for each observation in the sample. Black circles are point estimates and black bars represent 95% confidence intervals of those point estimates. The shaded historgram plots the number of disputes in the GATT and the WTO.

The size of the effect is substantively significant. Figure 3.3 shows the predicted probability of reaching a ruling in GATT vs. WTO disputes (Model 1, Table 3.1). The WTO dispute settlement mechanism increases the predicted probability of a ruling being issued by about 0.181 from 0.334 to 0.515 (95%CI: 0.071, 0.291), holding covariates at the observed values for each observation in the sample.[20]

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[20]I estimate the predicted probability of a ruling for each individual observation in the data to find out the change in the predicted probability associated with a switch of dispute resolution system from the GATT to the WTO. This observed-value approach utilizes the information from all the individual cases in the data rather than the "average case" used in the average-case approach (Hanmer and Ozan Kalkan, 2013).

3.5.2 Does the number of third parties increase the odds of litigation?

I present the same model specifications with an addition of the *Number of third parties* variable which is the main independent variable for testing Hypothesis 2. I present the probit regression results given the same limited dependent variable used in the previous models. Regarding the main effect of interest, the coefficient on the number of third parties participated in the dispute is positive and statistically significant from zero.

The results from Table 3.2 offer strong support for my theoretical expectations. Across all models, third-party participation is positively associated with the probability of litigation as suggested by the model predictions and the literature. As the number of third parties increases, the GATT/WTO disputes are significantly more likely to reach a ruling. Weaker complainants disproportionately fail to get a ruling issued in the absence of third party participation in both the GATT and the WTO.

Substantively, the predicted effects are quite large. Figure 3.4 shows the predicted probability of reaching a ruling by the number of third parties involved in a dispute based on the results in Model 1. The participation of third parties increases the predicted probability of reaching a ruling. Estimates use the probit model with all controls at the observed values for each observation in the sample. The majority of disputes involve no third parties. I plot four examples along with the number of observations in each category of the number of third parties ("Absence" to "High").[21]

In the absence of third parties, the predicted probability of reaching a ruling in a dispute is 0.291, holding covariates at the observed values for each observation in the sample. If the number of third parties involved in a dispute increases from none to 5, the predicted

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[21]The first category includes disputes in the absence of participation of third parties in the sample. The second category *Low* includes disputes with 1 - 5 third parties. The third category *Medium* includes disputes with 6 - 10 third parties. The last category *High* includes disputes involving more than 10 third parties.

Table 3.2: Probit models of GATT/WTO disputes, 1980-2018

	Ruling circulated		Ruling adopted	Panel established
	Model 1	Model 2	Model 3	Model 4
Number of third parties	0.131***	0.129***	0.095***	0.534***
	(0.033)	(0.032)	(0.020)	(0.092)
WTO	−0.019	−0.041	0.165	−0.332*
	(0.176)	(0.177)	(0.176)	(0.174)
Complainant GDP (log)	0.046		0.134***	0.043
	(0.052)		(0.052)	(0.064)
Complainant income PC (log)	−0.047		−0.082	0.192**
	(0.065)		(0.065)	(0.081)
Complainant GDPPC (log)		−0.003		
		(0.070)		
Complainant population (log)		0.019		
		(0.052)		
Complainant polity	0.031*	0.024	0.022	−0.001
	(0.018)	(0.018)	(0.018)	(0.021)
Defendant GDP (log)	0.165*		0.108	0.080
	(0.092)		(0.089)	(0.102)
Defendant income PC (log)	−0.307**		−0.389**	0.199
	(0.155)		(0.153)	(0.184)
Defendant GDPPC (log)		−0.166		
		(0.117)		
Defendant population (log)		0.172*		
		(0.094)		
Defendant polity	0.082***	0.091***	0.073***	0.019
	(0.027)	(0.027)	(0.025)	(0.027)
Intercept	−4.124**	−3.450**	−3.808**	−7.910***
	(1.668)	(1.592)	(1.695)	(2.250)
Observations	382	387	382	382
BIC	477.51	486.04	481.78	331.94
Log likelihood	-212.00	-216.21	-214.14	-139.21
Pseudo R^2	0.20	0.19	0.16	0.46
Weaker complainants?	Yes	Yes	Yes	Yes

Note: Cluster robust standard errors in parentheses. In Models 1-2, the dependent variable is a panel report circulated in a dispute. In Model 3, the dependent variable is a panel report circulated and adopted in a dispute. In Model 4, the dependent variable is a panel established in a dispute. Models 1-4 look at disputes when the complainant is weaker than the defendant. The level of analysis is the dispute level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3.4: Litigation and third parties in trade disputes (Model 1, Table 3.2)

95% confidence interval

Note to Figure 3.4: This figure presents the predicted probabilities of ruling circulated (vertical axis) across the levels of third-party participation (horizontal axis)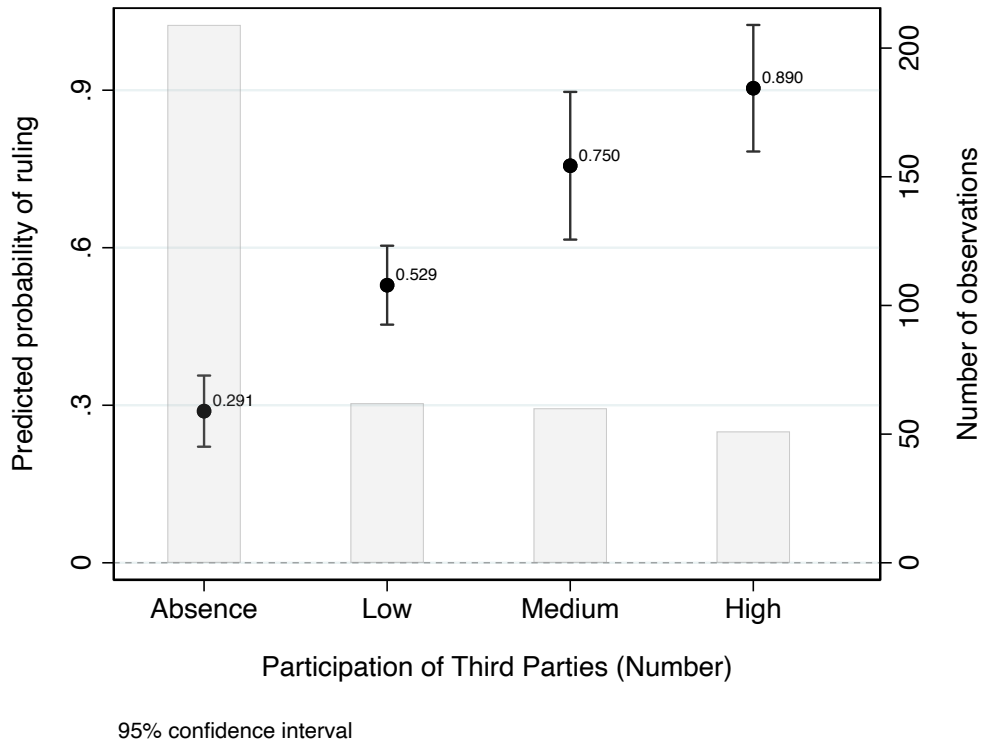. The first category includes disputes in the absence of third parties. The second category *Low* includes disputes with 1 - 5 third parties. The third category *Medium* includes disputes with 6 - 10 third parties. The last category *High* includes disputes involving more than 10 third parties. Using the estimates from Model 1 in Table 3.2, I calculated the predicted probabilties of ruling being circulated, holding covariates at the observed values for each observation in the sample. Black circles are point estimates and black bars represent 95% confidence intervals of those point estimates. The shaded historgram plots the number of disputes for each category of third-party particpation.

probability sharply increases by 0.238 (95%CI: 0.113, 0.366). As the number of third parties increases from 5 to 10, the predicted probability of a ruling increases by 0.221 (95%CI: 0.115, 0.296). If a dispute involves 15 third parties, the predicted probability of a ruling is 0.139 higher than that for the disputes with 10 third parties (95%CI: 0.087, 0.168).

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3.5.3 Do poorer complainants fare better in the WTO than the GATT?

For the analyses at the dispute-country pair-year level (Hypothesis 3), I run a series of random-effects models due to the absence of temporal variation in the main explanatory variable *WTO*.[22] I cluster the standard errors at the dispute level. I present the main results in Table 3.3. All models include dispute-level random effects to vary baseline levels of trade flows of the affected products across disputes.

Model 1 of Table 3.3 is the unconditional model. The coefficient on the independent variable *WTO* is positive but not statistically significant from zero. The coefficient on another independent variable *Complainant GDP* is positive and statistically significant from zero. Complainants with market power are expected to gain more from dispute settlement against their more powerful counterparts. In both GATT and the WTO dispute settlement, the rich are getting richer and the poor are getting poorer. Also this is not surprising given the conditional effectiveness of the WTO on power imbalance anticipated by the theory. In fact, this is consistent with my argument that the poor states will be most affected. A poorer complainant is more likely to benefit from the highly legalized dispute resolution system of the WTO.

Similarly, the coefficient on the defendant's GDP is positive and statistically significant, suggesting that larger economies are more likely to get what they want. The coefficients on the complainant's per capita income of both the complainant and the defendant are negative but statistically insignificant, suggesting that post-dispute trade flows are not affected by the disputing countries' level of development once the relative market power is controlled. The coefficients on polity score of both parties are not statistically significant, suggesting that having domestic audiences or not is unlikely to affect the gains from disputes.[23]

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[22]See Beck and Katz (2001) for review of the use of fixed effects in IR time-series cross-section models. See pages 492-493, in particular, for discussion of including fixed effects in terms of relatively time invariant covariates.

[23]The findings hold when I use an alternative democracy measure, *Democratic pair* being coded 1 if both parties are democracies, following Kucik and Pelc (2016).

Table 3.3: Regression models of post-dispute trade flows, 1989-2018

| | Imports of disputed products | | | |
	Model 1	Model 2	Model 3	Model 4
WTO	0.319	23.515***	(.)	22.167***
	(0.594)	(2.559)	(.)	(2.531)
Complainant GDP (log)	0.437***	1.058***	1.266***	0.953***
	(0.139)	(0.161)	(0.359)	(0.131)
WTO × Complainant GDP (log)		−0.861***	−1.072***	−0.766***
		(0.120)	(0.155)	(0.097)
Complainant income PC (log)	−0.266	−0.314	−1.192	−0.439*
	(0.262)	(0.265)	(0.940)	(0.254)
Prior imports (log)	0.571***	0.576***	0.412***	0.622***
	(0.076)	(0.071)	(0.070)	(0.067)
Total imports (log)	−0.214	−0.098	−0.015	0.037
	(0.164)	(0.167)	(0.502)	(0.109)
Complainant polity	−0.022	−0.009	0.076	0.019
	(0.028)	(0.028)	(0.079)	(0.024)
Defendant GDP (log)	0.362*	0.372**	4.663*	0.333***
	(0.192)	(0.184)	(2.671)	(0.102)
Defendant income PC (log)	0.226	0.216	−3.182	−0.098***
	(0.356)	(0.362)	(3.658)	(0.028)
Defendant polity	0.014	0.002	0.049	0.027
	(0.039)	(0.040)	(0.035)	(0.030)
Intercept	−14.125**	−32.504***	−97.551**	−28.338***
	(5.650)	(5.573)	(48.799)	(4.242)
Observations	735	735	735	1329
R^2	0.66	0.59	0.34	0.64
Dispute Fixed Effects	No	No	Yes	No
Weaker complainants?	Yes	Yes	Yes	No (All)

Note: Cluster robust standard errors in parentheses. Intercept not shown. Models 1-3 look at disputes with the complainant weaker than the defendant. Model 4 looks at all disputes. *WTO* constituent term omitted in Model 3 because it only varies by dispute and the specification includes fixed dispute effects. The dependent variable is the defendant's imports of the affected products from the complainant after the dispute. The level of analysis is the dispute-country pair -year level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The results show the impact of bilateral trade relationship on post-dispute trade flows. The coefficient on *Prior imports* is positive and statistically significant. Post-dispute trade flows of the affected products will increase with the strength of the bilateral trade relationship over the products. Conversely, the coefficient of *Total imports* is negative and statistically not significant, suggesting that post-dispute imports of the disputed products are not affected by the overall economic ties in terms of bilateral trade.

To test whether the impact of the WTO DSM on the complainant's payoff varies by the complainant' market power, Model 2 estimates an interaction effect between *WTO* and *Complainant GDP*. The coefficient on the interaction term is negative and statistically different from zero as hypothesized. I plot the marginal effect of the WTO as a function of the complainant's GDP in Figure 3.5. I also include a histogram of the conditional variable *Complainant's GDP (logged)*. Figure 3.5 shows that the effect of the WTO DSM is positive at low levels of the complainant's GDP,[24] and that the effect is increasingly negative as a function of the complainant's GDP. The effectiveness of the WTO decreases as the complainant's market power increases.

At the highest levels of complainant GDP (top 5%),[25] a switch of dispute settlement mechanism from the GATT to the WTO leads to a decrease in the complainant's exports flows to the defendant's market. Poorer complainants such as Nicaragua (1994) and Honduras (2005) are more likely to increase post-dispute trade gains in the WTO than the GATT, while rich complainants such as USA (2002) and EU (2014) are more likely to decrease the gains in the WTO relative to the expected gains in the GATT (Figure 3.6). [26] This shows that the WTO

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[24]About 22% of the sample falls in the category of the complainant's market power (i.e. the log of GDP below 25.49) at the 0.05 level. At the 0.1 level, about 27% of the sample falls in the category of the complainant's market power (i.e. the log of GDP below 25.69).

[25]About 5% of the sample falls in the category of the complainant's market power (i.e. the log of GDP above 30.14) at the 0.05 level. At the 0.1 level, about 10% of the sample falls in the category of the complainant's market power (i.e. the log of GDP below 29.67).

[26]Note that the model does not predict the effect of WTO dispute settlement becomes negative (and significant) for some rich countries. This is an interesting empirical finding but I find the effect depends on the coverage of

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Figure 3.5: Marginal effect of the WTO by the complainant's GDP (Model 2, Table 3.3)

95% confidence interval
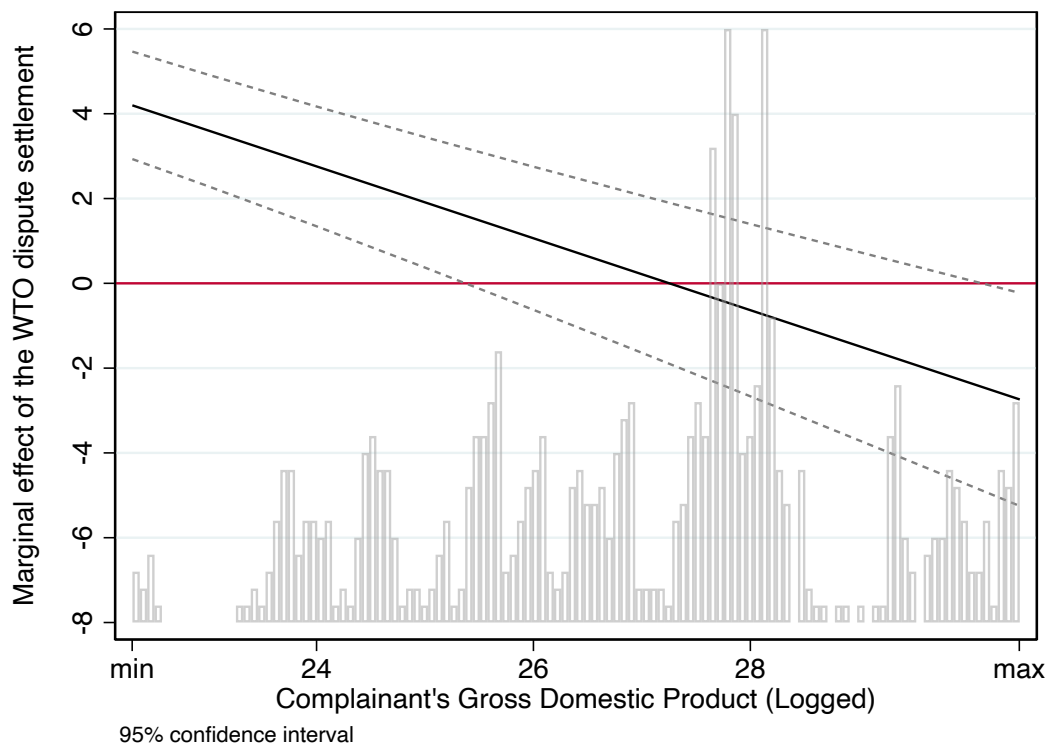
is providing a more level playing field to small and poor countries than the GATT, not only by increasing the gains of dispute settlement for poorer complainants but also by decreasing the gains for the richest complainants. I will further discuss this point by plotting the expected post-dispute trade flows (the GATT vs. the WTO) of several exemplary cases in Figure 3.7.

Model 3 includes dispute fixed effects. The *WTO* constituent term is omitted because it only varies by dispute while the model specification includes fixed dispute effects. The interaction term between *WTO* and *Complainant GDP* is negative and statistically different from zero. In Model 4, I present the same interactive specifications based on a sample of all

the sample. The negative effect becomes insignificant when I add more observations with high GDP into the sample by including more recent cases. In doing so, however, the number of observations has been dropped due to the shortened windows for trade data (e.g. three-year post-dispute trade windows rather than the five-year windows).

Figure 3.6: Marginal effect of the WTO by the complainant's GDP (Model 3, Table 3.3)

95% confidence interval.
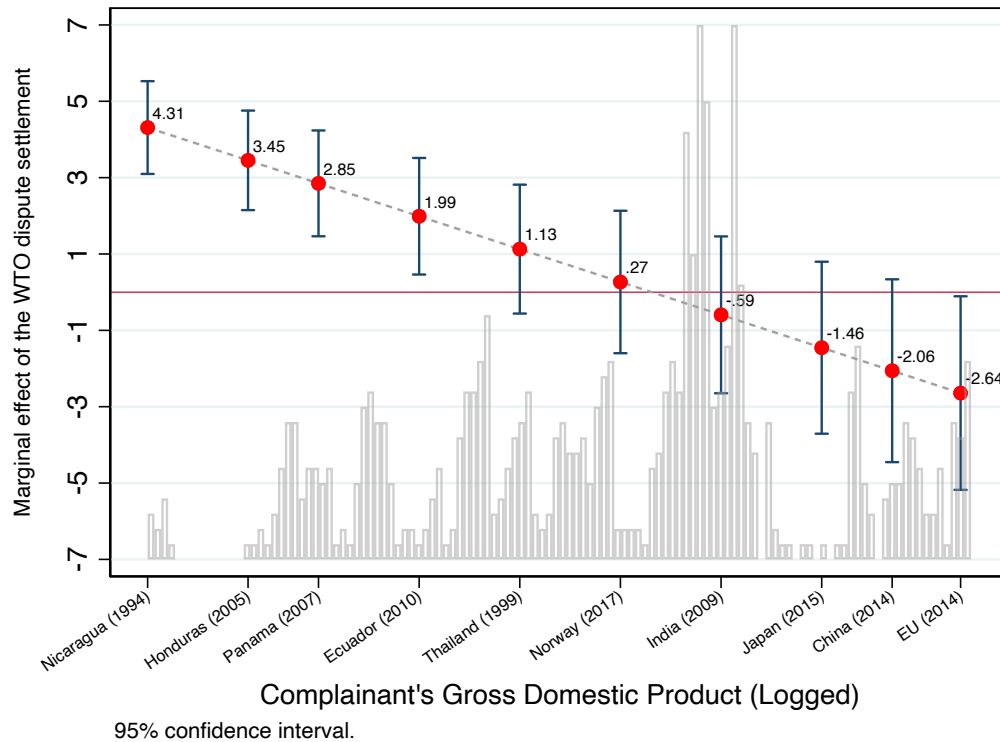
cases regardless of relative power of disputing parties. As a result, the sample includes both disputes with weaker complainants and disputes with weaker defendants relative to their counterparts. Regarding the main effect of interest, the coefficient on the interaction term in Model 4 is again negative and statistically significant. The marginal effect of the WTO dispute settlement is plotted in Figure B.2 in the appendix. The patterns are similar to those found in the sample of disputes with weaker complainants, except about 35% of the full sample falls in the category of the complainant's market power (i.e. the log of GDP below 27.62) at the 0.05 level where the WTO increases post-dispute trade gains for a complainant country.

Substantively, the size of the effect is significant. Figure 3.7 shows the predicted effect of the complainant's GDP on the complainant's post-dispute exports of the affected products to the defendant. Based on the results in Model 2, I plot four examples. When the complainant's

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Figure 3.7: Gains from trade disputes at the GATT vs. the WTO
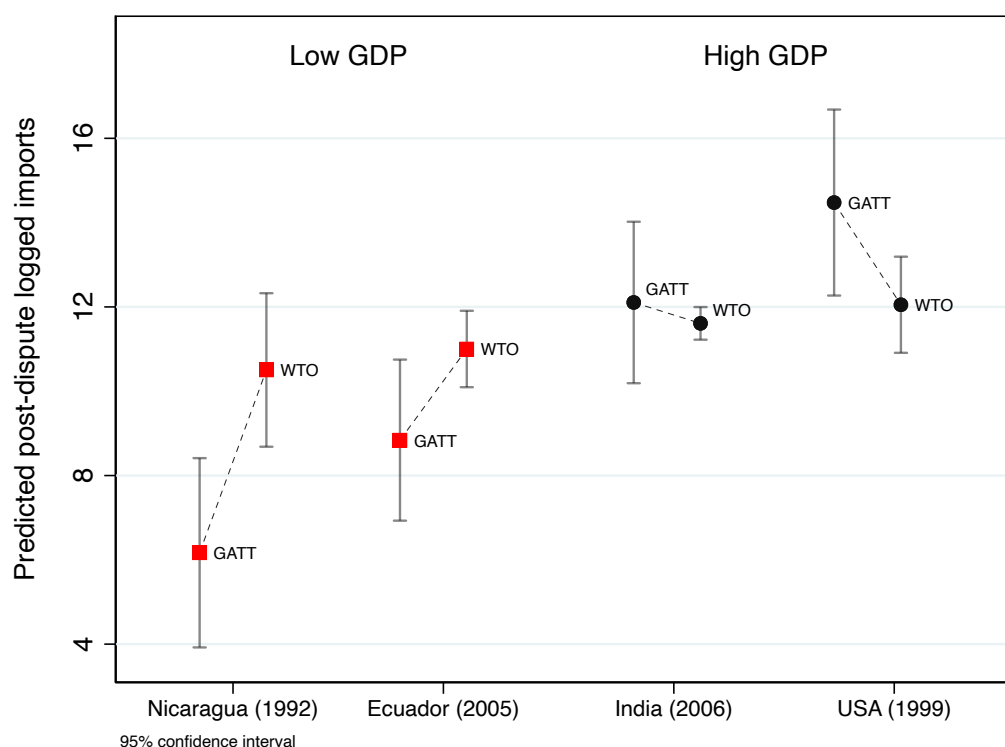
GDP is 4,710 million constant 2010 USD,[27] its post-dispute exports to the defendant are predicted to be 6.167 (95% CI: 3.922, 8.412) in logged dollars for GATT disputes, as opposed to 10.504 (95% CI: 8.683, 12.325) for WTO disputes. This amounts to a difference of $36 million. This is an increase of 76 times from $0.477 to $36.465 million.

For those complainant countries whose GDP is 58,880 million USD,[28] the post-dispute exports are predicted to be 8.839 (95% CI: 6.929, 10.750) in logged dollars for GATT disputes, as opposed to 11.002 (95% CI: 10.095, 11.908) for WTO disputes. This amounts to a difference of $53 million. This is an increase of 8.7 times from $6.9 to $59.98 million. For those complainant

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[27]In the first GATT *Bananas* dispute, Nicaragua's GDP was 4,710 million constant 2010 USD when it sued the EU in 1992 with other complainant countries including Colombia, Costa Rica, Guatemala, and Venezuela.

[28]When Ecuador filed a case against the United States in 2005 over the US' anti-dumping measures on shrimp from Ecuador, Ecuador's GDP was 5,888 million constant (2010) USD.

countries whose GDP is 1,290 billion USD,[29] the post-dispute exports are predicted to be 12.106 (95% CI: 10.190, 14.021) in logged dollars for GATT disputes, as opposed to 11.610 (95% CI: 11.223, 11.997) for WTO disputes. This amounts to a difference of $70.7 million. This is a decrease of 64 per cent in annual exports from $180.9 to $110.2 million. For those complainant countries whose GDP is 12,120 billion USD,[30] the post-dispute exports are predicted to be 14.476 (95% CI: 12.270, 16.682) in logged dollars for GATT disputes, as opposed to 12.051 (95% CI: 10.911, 13.192) for WTO disputes. This amounts to a difference of $1,764 million. This is a decrease of 11 times in annual exports from $1,935.6 to $171.3 million.

Overall, I find support for my argument that legalization of the dispute resolution mechanisms in the transition from the GATT to the WTO improves the unequal distribution of benefits of dispute settlement between the weak and the strong countries. The poor get more and the rich get less in the WTO disputes relative to the GATT disputes. The highly legalized dispute resolution system helps level the playing field for poorer and less powerful countries in the multilateral trading system.

3.6 Conclusion

In this chapter, I examine the effectiveness of the legalized dispute settlement system of the WTO relative to the GATT in three ways. Theoretical relationships drawn from the trade dispute models suggest that weaker complainant countries fare better under the WTO dispute settlement, relative to GATT dispute settlement. The results show that disputes filed in the WTO are more likely to reach litigation than those filed in the GATT. The results also show that the odds of litigation increase in the number of third parties involved because defendants are more likely to find winning the case in litigation beneficial. Lastly, the results show that

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[29]When India filed a case against the United States in 2006 over the frozen warmwater shrimp, India's GDP was 1,290 billion constant (2010) USD.

[30]When the US filed a case against the EC in 1999 over the agricultural products and foodstuffs, US' GDP was 12,120 billion constant (2010) USD.

poorer complainants are more likely to gain from WTO adjudication than they were to gain from GATT adjudication. Thus, poorer countries will increase trade of the affected products after WTO disputes more than GATT disputes. Richer countries are unlikely to experience any significant difference in post-dispute trade effects between the GATT and the WTO.

For empirical testing, I utilize two sets of original dispute data: a data set on GATT/WTO disputes at the dispute level and a data set on bilateral trade flows of the affected products at the dispute-country dyad-year level. I find support for my theoretical expectations, and demonstrate that (1) the WTO and the number of third parties are positively correlated with the probability of reaching litigation; and (2) WTO dispute settlement is correlated with post-dispute trade flows between disputing parties, conditional on the degree of the complainant's market power. These results indicate that the more legalized dispute settlement system leads to the use of international arbitration and greater publicity of the dispute. Third-party participation incentivizes the defendant to delegate power to the third-party dispute settlement, which benefits the weaker complainant. The highly legalized dispute settlement mechanism of the WTO provides significant *de facto* trade gains for poorer complainants but not for the majority of complainants.

My work contributes to a larger literature in political science that examines the effectiveness of international institutions in mitigating power asymmetries and promoting cooperation. While the dispute resolution system is central to the WTO, relatively little is known about when and why its strong legal features help promote fair competition and trade. My contribution is threefold. First, based on findings from game-theoretic analylsis, this study lays out and empirically tests circumstances where legalized dispute settlement systems help small and poor countries insulate themselves from power politics in the multilateral trading system. Second, while most research relies on aggregated trade flows to examine the distributional consequences of the WTO dispute settlement, I analyze disaggregated trade

data - bilateral trade flows of the affected products directly listed in the dispute - and examine the direct economic consequences of international adjudication. Third, to test the impact of legalization of intentional institutions in the context of international trade regime, I construct an original database for disputes at the GATT and the WTO. Compared to the existing relevant data, the coverage of my database is significantly greater in terms of number of dispute cases. To the best of my knowledge, my database is also the most fine-grained of the available data sets.

The findings have important policy implications and raise a number of questions: How far do powerful countries want international institutions to be legalized? When powerful countries find legalized international institutions hurting rather than protecting their interests, what is their incentive to remain in the system? Powerful countries abandoning such institutions is not unlikely. The US president Donald Trump has continuously threatened to withdraw the US from the WTO, arguing that the WTO treats the US unfairly. More recently, the US has blocked the nomination of the new judges of the WTO's Appellate Body, which seriously damaged the system.

Legalization of international institutions has the potential to destabilize the system by causing discontent among the most powerful and largest economies who are used to being the major beneficiaries of the multilateral trade regime and, consequently, their withdrawal from the system. One might call it a by-product of legalization. Yet, the question is how to structure institutions such that they decrease the rich-poor gap for public goods, but also incentivize participation by the richest members.

4. DISPUTE SETTLEMENT AND POWER ASYMMETRIES IN INTERNATIONAL TRADE:

REGIONAL TRADE AGREEMENTS AND THE WTO

4.1 Introduction

Along with the rise of global economic interdependence, regional trade agreement (RTA) have become increasingly common in the international trade system after the end of the Second World War.[1] The number of RTAs has increased rapidly during the past two decades. From 2000 to 2016, the number of RTAs doubled to reach more than 400 RTAs in force (WTO 2016). All WTO members are now involved in RTAs in force following the agreement between Mongolia and Japan in June 2016. The recent surge in regionalism is also noticeable. In the years between 2011 and 2016, 16 RTAs have been newly created per year, on average.[2] The proliferation of RTAs is neither limited by geographic boundaries nor the level of economic development. RTAs have spread throughout the world between and within continents, and among developed and developing states. Most nations are involved in one or more RTAs; even nations without any RTAs are not completely outside the range of RTAs. As Bhagwati and Krueger (1995) have put it, we now live in a world like a "spaghetti bowl" where every nation is connected with different types of RTAs in a very complex way.

Although there is a great variation, almost all RTAs have systems of dispute resolution. Despite the continuing surge in RTAs with DSMs, however, previous studies found that the WTO has been used more frequently than RTA for dispute resolution (Chase et al., 2013).

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[1] In this paper, regional trade agreement (RTA) refers to all types of non-multilateral agreements: free trade areas, customs unions, common markets, and economic unions. Most RTAs in force are free trade agreements (FTAs) and partial scope agreements, which account for 90% of the total 423 RTAs in force and notified to the WTO. Customs unions account for only 10% of these RTAs. RTAs also include international trade pacts across different regions such as EU-Mexico and Korea-Chile.

[2] Fifteen new agreements were notified to the WTO in 2011, twenty-four in 2012, twenty-two in 2013, twelve in 2014, ten in 2015, and thirteen in 2016 (the WTO RTA Database, `http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx`. Accessed May 19, 2018).

Consider the United States-Korea Free Trade Agreement (KORUS FTA) which entered into force on March 15, 2012. The bilateral agreement contains dispute settlement mechanisms (DSMs) in two formal ways: state-to-state disputes about the imposition of tariffs or non-tariff trade barriers or investor-state disputes over breach of an investment agreement. Since its establishment, the bilateral trade agreement between the U.S. and Korea has not listed any dispute which came through panel processes.[3] In comparison, Korea has brought two cases against the U.S. to the WTO which reached panel establishment since 2012.[4] Before the entry into force of the U.S.-Korea trade agreement, there were a total of fourteen cases between the U.S. and South Korea brought to the WTO. Out of fourteen, five cases were brought by the U.S. and nine cases were brought by Korea.[5]

Like the KORUS-FTA, most dispute settlement mechanisms found in regional trade agreements (RTAs) are inactive.[6] For example, there are only four cases brought to the Caribbean Common Market (CARICOM) since its establishment in 1973. Those four disputes are between individual investors and states.[7] In Africa, the Economic Community of West African States (ECOWAS), the Southern African Customs Union (SACU), and the Southern African Development Community (SADC) oversaw a few cases which are either investor-state disputes or resolved before panel process. In Asia, the Association of Southeast Asian Nations

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[3]The Joint Committee has met three times at the Ministerial level. However, there does not exist any official records beyond the state.

[4]DS464 "Anti-dumping and countervailing measures on large residential washers from Korea" (requested consultations on 29 August 2013) and DS468 "Anti-dumpling measures on certain oil country tabular goods from Korea (requested consultations on 22 December 2014)." The panel was composed for both cases and the U.S. appealed to the Appellate Body for DS464.

[5]WTO RTA Database. `http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx`. Accessed May 20, 2018.

[6]There are some active DSMs such as the European Court of Justice (ECJ), the European Free Trade Association (EFTA), Preferential Trade Area for Eastern and Southern American Common Market (Mercosur), the Andean Community, and the Central American Common Market (CACM). For example, the North American Free Trade Agreement (NAFTA) lists more than 200 disputes and the Preferential Trade Area for Eastern and Southern American Common Market (Mercosur) lists more than 300 cases. I will come back to these cases later in section 4.6.

[7]Before the inauguration of the Caribbean Court of Justice (CCJ) in 2005, an ad hoc tribunal was considered as the dispute settlement mechanism of CARICOM, which has never been used (Chase et al., 2013, 46).

(ASEAN) has never witnessed a case brought to its DSM.

The empirical irregularity of disuse of RTA DSMs raises a series of questions: Why do states choose the WTO over regional trade agreements to resolve their disputes? Does the states' choice of forum indicate that the WTO's dispute settlement mechanism (DSM) is more legitimate and effective than that of RTAs? The relative disuse of RTA DSMs does not mean that an analysis of RTA DSMs is unimportant, rather, it leads to the puzzle of this paper: Why do states create DSMs in regional trade agreements if they do not use these DSMs?

Seeking answers to the puzzle, this paper compares the design and effects of dispute settlement systems between RTAs and the WTO. Rosendorff (2005) shows that the WTO's dispute settlement system brings more flexibility to the multilateral trading system and hence, enhances systematic stability. In this chapter, I extend Rosendorff's game theoretic model of the WTO to RTAs to find out what leads states to use the WTO over RTAs to resolve their disputes. I examine the role of dispute settlement mechanisms across trade regimes in shaping states' bargaining strategies. The model demonstrates that states will face losses of their strategic flexibility in RTAs more than in the WTO. The greater loss of flexibility states face in RTAs compared to the WTO leads to an increase in the per period probability of breakdown and, consequently, reduces stability of the trading system.

Additionally, RTA's dispute settlement mechanisms reinforce inequalities more than the WTO's dispute settlement mechanism. Small and poor countries can more efficiently insulate themselves from power politics under the WTO than RTAs. This result brings us to what lies at the root of the relative disuse of RTA DSMs. The frequent use of the WTO results from its superiority in avoiding system breakdown and leveling the playing field for small and poor countries, compared to RTAs.

4.2 Previous Research on Dispute Settlement Mechanisms

While regionalism gathered momentum over the last two decades, the legalization of international institutions also attracted the attention of academics as another salient trend in international trade systems. The abundant literature on international adjudication examines whether legalization of international institutions increases systemic stability or promote international cooperation (e.g. Keohane, Moravcsik, and Slaughter, 2000; Maggi, 1999). Previous studies on DSMs have been largely carried out on the multilateral trade system, the WTO (e.g. Kucik and Pelc, 2016; Rosendorff, 2005).

Some argue that the WTO, vested with more legal power through the dispute settlement system, increases the level of international cooperation and promotes trade liberalization. There are different views on how the procedure facilitates cooperation. On the one hand, legalization of the WTO with the stick of the highly legalized dispute settlement mechanism prevents member states from defection and increases the compliance rates (e.g. Goldstein et al., 2000a; Smith, 2000). A harsher punishment against defection by member states will strengthen the bargaining power of developing countries (e.g. Park, 2000).[8] Legalization of international organizations allows the transmission of information to voters about a state's trade behavior, which increases the compliance rate of member states (e.g. Chaudoin, 2010; Fang, 2008).

On the other hand, the legalized dispute settlement mechanism provides opportunities for members to manipulate the system, acting as a carrot rather than a stick (e.g. Fearon, 1998; Rosendorff and Milner, 2001). For instance, Rosendorff (2005) shows that the WTO's dispute settlement mechanism enhances the stability of the multilateral trading system by bringing flexibility to the system. The underlying logic is that the dispute settlement mechanism allows

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[8]"Irreversible investment" strengthens the punishment power of the small countries disproportionately, which helps raise the bargaining position for small countries (Park, 2000).

states to temporarily violate in response to domestic political pressure for trade protection.

Unlike this positive view, other scholars argue that the WTO's strong dispute settlement mechanism deters the use of harsh punishment and causes inefficient outcomes in trade negotiations. Ludema (2001) argues that the dispute settlement system disables the use of strong punishment against defections, which will reduce the level of national welfare. Bown (2005) shows that under the WTO, the system of dispute settlement discourages developing countries' participation in legal disputes. The WTO's dispute settlement mechanism has institutional bias due to the self-representative and self-enforcing features. Small countries lack resources to monitor violations and participate in costly legal proceedings. Tariff retaliation is also useless due to their lack of economic influence. Busch and Reinhardt (2003a) argue that the dispute settlement system not only reinforces the power disparity of the trade regime but also expands the gap between rich and poor member states in their use of the WTO DSM.

In addition to the WTO DSM, RTAs usually have dispute settlement mechanisms. In all the overlapping areas between the WTO and RTAs, such as intellectual property, services, and investment, RTAs include chapters which discuss dispute settlement procedures. Empirical studies on RTA DSMs have continuously tried to understand the role of DSMs used in RTAs and the factors which determine the level of legalism in RTAs (e.g. Chase et al., 2013; Jo and Namgung, 2012; Smith, 2000).

Yet, studies on RTA DSMs have not yet fully explained their dynamics but largely focus on potential conflicts between dispute settlement mechanisms across trade regimes (e.g. Hillman, 2009; Marceau and Wyatt, 2010). In the study of regionalism and multilateralism, there have been a handful of game theoretical analyses (e.g. Aghion, Antràs, and Helpman, 2007; Riezman, 1985). In this chapter, I construct a model of trade disputes in RTAs building on Rosendorff's (2005) model of WTO dispute settlement mechanism. In the framework of a repeated Prisoners' Dilemma game, I analyze how dispute settlement mechanisms shape

state behavior across trade regimes. I examine structural differences in the institutional design of dispute settlement system between RTAs and the WTO and the consequences of the differences in terms of states' strategic choices. This study deepens our understanding of the dynamics and the new features of the current global trading system.

4.3 Prisoners' Dilemma: Trade Game with Dispute Settlement Mechanism

I extend Rosendorff's analysis of the WTO DSM which shows that the introduction of the DSM to the WTO system allows states to "temporarily suspend their obligations in periods of unexpected, but heightened, domestic political pressure for protection" (389). I briefly summarize the setup of his model and then move to the extended model for RTA DSMs.

For the sake of simplicity, the model focuses on bilateral trade relations between two state actors. Players simultaneously choose their tariff levels in response to domestic political pressures. Along with the choice of tariffs, players have three action profiles: cooperation, settlement, and defection. When both players keep their tariffs as low as the agreed level, i.e., both players choose cooperation strategies, they both receive gains from free trade. If a player imposes a tariff higher than the binding tariff level, the cooperative party suffers from its loss from trade. The amount of compensation paid by the violating party is calculated based on the difference in the complainant's expected payoff when both players cooperate and when only the complainant cooperates. The violating player decides whether it pays compensation or not if it loses the case. Why does the player choose to pay compensation? By paying compensation, the violating player stays in the system and benefits from free trade. Given that the compensation is made only if the panel finds in favor of the complainant, the loss function is weighted by the probability the complainant prevails, denoted by θ which is a common probability.

A state that chooses the defection strategy imposes a tariff which is higher than the

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agreed tariff, i.e., $t > t^c$ or $\tau > \tau^c$, and is followed by non-compliance and exit from a treaty. Therefore, the defection strategy leads to the breakdown of the bilateral trade agreement which eliminates gains from cooperation. If a player chooses settlement as a strategy, the player sets a higher tariff than the agreed tariff level, complies with panel rulings (by paying compensation if it loses the case), and stays in the trading system. This game is infinitely repeated.[9] Also, this game assumes that each player adopts the *Grim Trigger* strategy so that a deviation is followed by infinite punishment.

Then, why does a player ever want to defect from the agreement despite future losses (i.e. the expected gains from cooperation)? As the name, *Prisoners' Dilemma*, strongly suggests, it is because each player has incentives to renege on agreements.[10] Then where do the incentives come from? In order to answer the question, let us consider the decision making process of the players. When players choose tariff levels simultaneously in each round, they take four components into account: welfare of consumers, profits of import and export-competing firms, and tariff revenues.

The higher the tariff the home government chooses, the greater the profit of import-competing firms.[11] By contrast, the profit of exporters is influenced by the foreign tariff. The higher the tariff of the foreign government on exporting goods from the home country, the lower the profit of the exporters at home. Changes in tariffs also affect consumers, too. An increase in tariffs raises the price of imported goods, thereby reducing consumer surplus in the home country.[12] Given that, government incentives to impose higher tariffs result from

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[9]States discount their future payoffs according to the discount factor $0 < \delta < 1$. The model allows the possibility that the benefits of cooperation may grow larger over time. Along with globalization, the multilateral trade regime of the WTO expands and the number of regional trade agreements continuously increases. Greater economic integration accelerates trade liberalization by lowering transaction costs, reallocating resources, and spreading the ever-developing technologies across the globe. Taken all together, the benefits of freer trade grow over time.

[10]The incentives to defection result in the failure of cooperation at the equilibrium.

[11]Firms' profits are assumed to be an increasing concave function.

[12]Changes in foreign tariffs affect not consumers at home but foreign consumers by raising prices of exported goods which foreign consumers face.

political pressures for protection that a government experiences. Political pressure varies in a stochastic manner over time and is captured by the weights a state puts on the interests of the import-competing sectors (a and α for the home and foreign country, respectively).[13] Thus, the higher the political pressure, the greater the government gains from imposing high tariffs on imported products. After observing its level of political pressure, each player simultaneously chooses its tariff (t, τ) at the beginning of each round of the game. In other words, after observing incentives to defection, each player simultaneously chooses a strategy: imposing cooperative tariffs, defective tariffs with compensation, and defective tariffs without compensation.

Let C and C^* denote the payoffs of a strong and weak government, respectively, when both are cooperating by choosing a tariff that is lower than or equal to the agreed tariff level. Let N and N^* denote the payoffs of a strong and weak government, respectively, when both violate the tariff binding by choosing a tariff that is higher than the agreed tariff. Let D and D^* denote the payoffs of a strong and weak government, respectively, when it violates the tariff agreement it has with its trading parter. Let S and S^* denote the payoffs of a strong and a weak government, respectively, when it cooperates by choosing a tariff lower than the agreement while its trading partner violates the tariff binding. The following preference order creates a Prisoners' Dilemma game: $D > C > N > S$.[14] In this classic PD game, a Nash Equilibrium (NE) exists when both players defect from their agreed tariff by choosing higher tariffs in a one-shot game. In the infinitely repeated game, both players choose different tariffs which create an equilibrium alternative to defection from both sides.

The dispute settlement strategy (DSS) is defined as a strategy in which a player having

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[13]The level of political pressure varies from round to round to represent changes in economic conditions and they are independently and identically distributed on $(0, +\infty)$ with a cumulative distribution function (cdf) of Φ. Each state knows its level of pressure but not the other's at the beginning of each period.

[14]Players have only two actions in their action profiles: Cooperation (C) and Defection (D), which creates a classic 2 by 2 PD game. In the following section, players have an additional action, Settlement (S), which creates a 3 by 3 PD game.

drawn politics of type $\hat{a}$, plays *Defect* if the other player has played *Defect* in any period in the past; otherwise the state plays *Cooperate* if the politics type is smaller than its lower cut-off point $\hat{a} < \underline{a}$, plays *Settle* if the politics type is between the lower and the upper cut-off points $\underline{a} \leq \hat{a} \leq \bar{a}$, and plays *Defect* if the politics type is greater than its upper cut-off point $\hat{a} > \bar{a}$. (Rosendorff, 2005, 394).[15]

4.3.1 Extension

In the model extension, I differentiate players regarding their relative power. Power asymmetries in the model allow us to examine the different impacts of DSMs on trade strategies between strong and weak players. Without a power disparity, all members in the trade model have the same dispute settlement strategy if the given political pressure level is the same. In other words, the same level of political pressure leads to the same strategy of all players: Cooperation (C), Settlement (S), or Defection (D). If one state cooperates at a certain level of pressure, other states also choose to cooperate when facing that same pressure. By differentiating the players' relative power, the model allows the possibility that a certain level of political pressure could provide enough incentive for a player to defect but fail to incentivise the other player to defect from cooperation. Therefore, the extended version is more flexible in addressing heterogeneous players in the game.

Power disparity among the players in the model also helps incorporate attributes of RTAs to the trade game in which the Rosendorff's WTO model does not capture. In the extended model, power is associated with the likelihood that each player prevails in the case. Let λ (λ^*) denote the probability that the panel finds in favor of the strong (weak) plaintiff such that $0 < \lambda$ (λ^*) < 1. The WTO model does not distinguish between players so that all players are equally likely to win the case (denoted by θ). In the WTO model, the case is judged by its

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[15]Rosendorff showed that a pair of the dispute settlement strategy (DSS) is a Nash Equilibrium. See Rosendorff (2005) for details.

merits, while cases are biased by power in the RTA model.[16]

The extended RTA model also captures the burden of litigation costs. Disputing parties suffer from costs that international dispute settlement procedures incur. RTA DSMs entail disparity in the burden of costs attributable to the differences in financial and legal resources at their disposal. The burden of legal expenses in DSM processes for a member country is denoted by κ (κ^*) > 0 for a stronger (weaker) player. I will come back to those terms later in subsection 4.4.1 with further details.

Recall that players must simultaneously choose tariffs in response to stochastic domestic political pressure. Both players have three action profiles. A state might cooperate (C), settle a dispute through a DSM (S), or defect by non-compliance (D). In other words, a state plays C by setting a tariff lower than or equal to the agreed level, $t \leq t^c$ or $\tau \leq \tau^c$. By playing S, a state violates the agreement by setting its tariff level higher than the tariff agreement, $t > t^c$ or $\tau > \tau^c$, and pays a compensation if it loses a dispute. A state plays D if a state imposes a tariff such that $t > t^c$ or $\tau > \tau^c$ and does not pay compensation in the event of losing a case. Figure 4.1 is a 3×3 normal form representation of the one-shot trade game in an extended model setting described above.

Each period, a state decides tariffs based on the cost and benefit calculation associated with these actions profiles. Suppose states exchange their goods and services in accordance with their choice of tariffs. Then, each state is always better off by imposing a high tariff. Both players have incentives to set tariff levels as high as possible, above the agreed level. The situation, therefore, portrays the issue of Prisoners' Dilemma. If the game repeats, however, players face expected future losses of gains from cooperation. In an infinitely repeated game with grim trigger punishments, a one-time violation without complying with panel rulings, i.e. playing D, leads the other side to play D forever. Therefore, this game shows a dynamic of

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[16]If we assign the same probability of winning to all players in the game $\lambda = \lambda^* = \theta$ (because they are differentiable by power), the game is equivalent to the original WTO model of Rosendorff.

Figure 4.1: Payoffs in the 3×3 normal form regional trade game

		Weak		
		C^*	S^*	D^*
Strong	C	$C(a)$ $C^*(\alpha)$	$S(a,\hat{a}) + \lambda L(\hat{a}) - \kappa$ $D^*(\hat{a}) - \lambda L(\hat{a}) - \kappa^*$	$S(a,\hat{a}) - \kappa$ $D^*(\hat{a}) - \kappa^*$
	S	$D(\hat{a}) - \lambda^* L^*(\hat{a}) - \kappa$ $S^*(\hat{a},\alpha) + \lambda^* L^*(\hat{a}) - \kappa^*$	$N(\hat{a},\hat{a}) + \lambda L(\hat{a}) - \lambda^* L^*(\hat{a}) - \kappa$ $N^*(\hat{a},\hat{a}) + \lambda^* L^*(\hat{a}) - \lambda L(\hat{a}) - \kappa^*$	$N(\hat{a},\hat{a}) - \lambda^* L^*(\hat{a}) - \kappa$ $N^*(\hat{a},\hat{a}) + \lambda^* L^*(\hat{a}) - \kappa^*$
	D	$D(\hat{a}) - \kappa$ $S^*(\hat{a},\alpha) - \kappa^*$	$N(\hat{a},\hat{a}) + \lambda L(\hat{a}) - \kappa$ $N^*(\hat{a},\hat{a}) - \lambda L(\hat{a}) - \kappa^*$	$N(\hat{a},\hat{a}) - \kappa$ $N^*(\hat{a},\hat{a}) - \kappa^*$

states' choices in trade behavior in response to varying levels of domestic political pressure.

Before we move to the dispute settlement strategy (DSS) in an extended mode, I clarify a couple of terms: B and $\wedge_{DS}$. First, $B(a)$ (for a stronger player, $B(\alpha)$ for a weaker player) represents the gains from defection, i.e. $B(a) \equiv D(a) - C(a)$.[17] An increase in political pressure to protect domestic industries raises gains from playing (D) relative to playing C. Second, $\wedge_{DS}$ captures the difference in expected benefits between playing cooperation strategy - either C or S - and defective strategy D. The expected benefits are the aggregate payoffs from gains in the current period and continuation value of playing the strategy.[18] Intuitively, large gains from defection and high costs of litigation lead states to forgo cooperation forever.

The first cutpoint in the DSS above determines whether a player cooperates or defects without the intention of entirely withdrawing from the treaty. In order to do so, the state needs to know how much it will gain from a violation and how much it will lose from their payment of compensation if they lose the resulting dispute. If a player gains more by temporary defection than by cooperation, it will defect once and stay in the treaty. This means that a player given a draw $\hat{a}$ prefers (temporary) defection over full cooperation when the sum of

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[17]$B'(a) > 0$ is assumed, which implies that the gains from defection increase as political pressure grows.

[18]I assume that $(1-p)(\lambda - \lambda^*)L + p^2\kappa$ is small enough. For details, see the appendix.

gains from a violation, the expected loss from compensation to pay, and the costs involved in DSM-litigation outweighs its expected cooperation value. Compensation is the amount of loss the other - cooperative - player gets paid by the violator when the complainant wins the case with probability of λ^*.

Therefore, a player compares its expected cooperation value ($\underline{C}$), with the suspension of their obligations ($D(\hat{a}) - \lambda^* L(\hat{a}) - \kappa$). For example, a member country given a draw $\hat{a}$ defects without exit from the treaty if $D(\hat{a}) - \lambda^* L(\hat{a}) - \kappa > \underline{C}(\hat{a})$, the expected value of cooperation. Now, we define the first cutpoint, a_1, such that $D(a_1) - \lambda^* L(a_1) - \kappa = \underline{C}(a_1)$ as a lower bound for the player to temporarily defect followed by staying in the treaty forever, i.e., the settlement strategy (S). In other words, $\lambda^* L^*(a_1) + \kappa = B(a_1)$.

The second cutpoint in the DSS determines whether a violating member country pays compensation which is set by a panel in order to stay in the treaty forever or exits from the treaty by defying the panel ruling when the panel finds in favor of the plaintiff. Therefore, the second cutpoint a_2 satisfies $\lambda^* L^*(a_2) + \kappa = \wedge_{DS}$ where $\wedge_{DS}$ is defined as "the level of the cost such that, if the government plays the cooperate strategy (either C or DS) into the indefinite future, the expected (net) benefits from doing so are equal to the expected benefits of defecting once and exiting the system forever." (Rosendorff, 2005, 394).[19] In other words, a player given a draw $\hat{a}$ will settle by paying compensation in order to stay in the system after defection rather than to exit the agreement, when $\lambda^* L^*(a_2) + \kappa < \wedge_{DS}$. The DSS in an extended regional trade model is defined as the following and described in Figure 4.4 from the stronger player perspective.

Definition 1. *A Dispute Settlement Strategy (DSS) is a strategy in which a strong (weak) party with politics type $\hat{a}$ ($\hat{\alpha}$) drawn, plays* D *if* D *has been played by the other player in any period*

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[19] $\lambda^* L^*(a_2) + \kappa = \frac{\delta}{1-\delta}(p^2(N-S-D+C) + p(D-2N+S)) \equiv \wedge_{DS}$ (where $p = Pr(a < a_1)$, and $I = \int_\alpha \int_a I(a, \alpha) d\Phi d\Phi$ for $I = D, N, S, C$).

in the past; otherwise it plays C *if* $\hat{a} < a_1$ *(*$\hat{\alpha} < \alpha_1$*) by setting* $t = t^c$ *(*$\tau = \tau^c$*), plays* S *if* $a_1 \leq \hat{a} \leq a_2$ *(*$\alpha_1 \leq \hat{\alpha} \leq \alpha_2$*) by setting* $t = t^D(\hat{a})$ *(*$\tau = \tau^D(\hat{\alpha})$*) and paying compensation if it loses, and plays* D *if* $\hat{a} > a_2$ *(*$\hat{\alpha} > \alpha_2$*) by setting* $t = t^D(\hat{a})$ *(*$\tau = \tau^D(\hat{\alpha})$*) and not paying compensation if it loses.*

Proposition 4. *A pair of DSS strategies is an Nash Equilibrium (NE).*

The following section shows the dynamic of changes in the DSS from that of the WTO, made by the elements exclusive to RTAs: (1) the probability that a panel finds in favor of a plaintiff denoted by λ and λ^*, and (2) the burden of litigation cost denoted by κ and κ^*. Those terms represent two different ways by which power asymmetries between disputing parties influence the structure of the game. Adding one additional RTA component at a time to the WTO model allows us to examine the impact of each element of RTAs on strategies between the strong and the weak.

4.4 Power Asymmetries in RTA DSMs

4.4.1 Winning a Dispute

I analyze the effect of different chances of winning as a complainant between the strong and the weak, without taking the costs of DSM litigation into consideration. The extended regional trade model assumes that a member country's chance of winning in a dispute depends on the relative size of power among disputants, while the chance is equal to every member in the WTO model. Therefore, power asymmetries are transferred into the extended model through disparate chances of winning a dispute.

First, weaker members in disputes against stronger partners are more likely to be vulnerable to the economic and diplomatic consequences of being involved in dispute resolution. Consider a dispute between the U.S. and Mexico. The dispute will have a bigger impact on the economy of Mexico than the economy of the U.S. The deterioration of economic conditions

along with aggravation of the relationship with the trading partner is more likely to bring an election outcome against incumbents in Mexico than the U.S. Therefore, richer countries are more likely to be able to derive concession from weaker countries before a panel ruling is issued. Busch and Reinhardt (2003*a*) find that in RTA DSMs, larger and richer countries disproportionately win disputes during consultations or panel deliberations prior to rulings at the expense of smaller and poorer countries.

Second, RTA DSMs are more power-based than the WTO DSM. Despite similarities in the design of DSMs, RTAs and the WTO are different in the level of legalism in their DSMs.[20] Most RTA DSMs are considered to be a medium level of legalism. They are less likely to hold impartial third-party review and require ad hoc panels.[21] The WTO DSM is considered to be a high level of legalism. It consists of a standing body, a so-called dispute settlement body (DSB), and the process of appellate body (AB) review. Thus, the system of dispute resolution under the WTO is considered to be more rule-based and more effective in offsetting power disparities across countries than RTAs (Davey, 2006). Under the power-based structure of RTA DSMs, panel rulings under RTAs tend to be more vulnerable to nationality bias and considered less legitimate than that of the WTO. Therefore, the WTO DSM mitigates asymmetries in bargaining power among members with different sized economies more effectively than more power-based RTA DSMs.

Given the reasons above, I expect that the design of dispute resolution in RTAs yields more disparity in the rate of winning disputes than in the WTO. Weaker and smaller countries disproportionately fail to win in disputes under the more power-based system of RTA DSMs than the more rule-based system of WTO DSM. The stronger country's chance of winning

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[20]Previous studies find that the design of dispute resolution in RTAs and that of the WTO are similar to each other due to emulation. Jo and Namgung (2012) show the effect of emulation on the design of DSMs in regional trade agreements by sharing memberships.

[21]The term, "high and medium level of legalism", follows the typology used in the study of Jo and Namgung (2012) which is associated with a more detailed classification carried out by Smith (2000). Chase et al. (2013) use different names for the level of legalism in RTAs, i.e., quasi-judicial and judicial for medium and high legalism, respectively.

in a regional trade dispute is higher than its chance in a WTO dispute which is equal for every member country. Also, the weaker party has a lower chance of winning in disputes against a stronger party in RTAs than its chance in the WTO. The following assumption shows a clear-cut logic of such disparities between the stronger and weaker member states in the extended model.

Assumption 1. *$\lambda^* < \theta < \lambda$ where θ is the common probability of winning in WTO disputes for all members and λ (λ^*) is a strong (weak) complaining party's probability of winning in RTA disputes.*

A complainant's chance of winning affects the expected costs of violation, thereby leading to changes in the players' cost and benefit calculation of strategies. A stronger player considers how much it needs to compensate a weaker player who becomes a sucker if it defects from an agreed tariff. The expected cost of compensation is the loss of its trading partner weighted by the probability the cooperative weak player prevails in the case, i.e., $\lambda^* L^*(a)$.[22] λ^* influences the cut-point of the stronger player's dispute settlement strategy. For a strong player, the smaller chance of losing a dispute in RTA DSMs ($\lambda^* < \theta$) pulls down its lower cutpoint a_1 below that of the WTO $\underline{a}$ and raises its upper cutpoint a_2 above the WTO's $\bar{a}$.

Figure 4.2 represents these changes of smaller a_1 and larger a_2 compared to their counterparts in the WTO model. The changes widen the area of settlement S for a stronger party's DSS. The enlarged area of S also means a decrease in the areas of C and D, representing cooperation and defection strategies, respectively. The larger area of temporary suspension of obligations through RTA DSMs represents an increased flexibility of the stronger party. Therefore, it implies that in the RTA trade model a stronger party is more capable of manipulating the trading system. The increased area of manipulation S results from a decrease in the area

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[22]By the same logic, $\lambda L(\alpha)$ is the weak player's expected costs of violation.

Figure 4.2: Expansion of settlement strategy for a stronger party
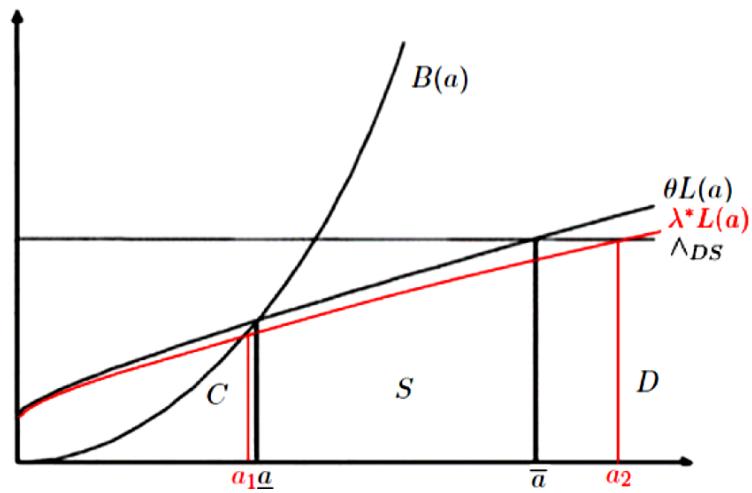
Note: a weaker party is a complainant whose probability to prevail in trial is λ^* s.t. $\lambda^* < \theta$

of full defection more than full cooperation. In the regional trading system, a stronger player is more likely to stay in the system not by cooperating more but by defecting temporarily.

Figure 4.3: Contraction of settlement strategy for a weaker party

Note: a stronger party is a complainant whose probability to prevail in trial is λ s.t. $\lambda > \theta$

Then how does the disparity of winning disputes affect a weaker party? For a weaker party to violate, it considers its expected costs of violation which depend on the magnitude of defection and the probability the complaining party wins in the 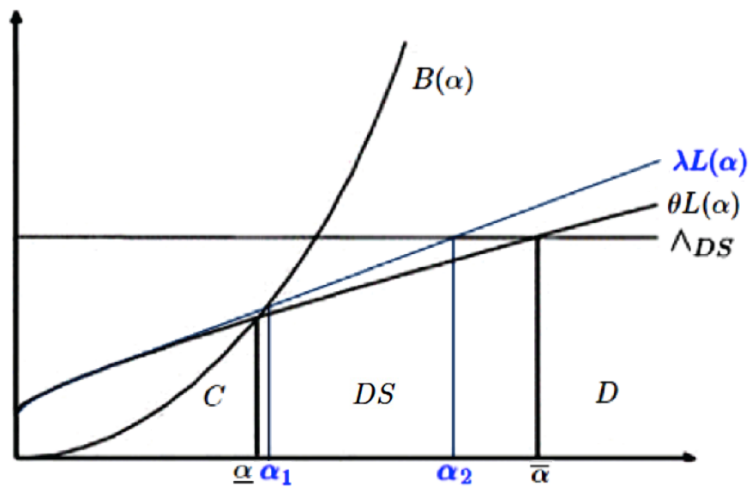dispute, λ. A weaker party is more likely to lose a case against a stronger party in more power-based RTA DSMs than the WTO DSM, $\lambda > \theta$. The increased expected costs of violation from $\theta L(\alpha)$ in the WTO model to $\lambda L(\alpha)$ in the RTA model, therefore, pulls up the first cutpoint α_1 above $\underline{\alpha}$ and drags down the second cutpoint α_2 below $\bar{\alpha}$. Such changes narrow down the area between the two cutpoints, the area of settlement strategy S, which is described in Figure 4.3. The narrower range of temporary suspension of their obligations represents the contraction of flexibility in DSS which is allocated to weaker states. Weak states become less capable of manipulating the trading system than they were in the WTO. Also, the loss in the area of S results from an increased area of full defection D more than full cooperation C. Therefore, a weaker player is more likely to violate an agreement without following through RTA DSMs than the WTO DSM, leading to a breakdown of the trading system.

4.4.2 Litigation Costs

Now, let us consider the burdens of litigation costs through which power asymmetries are transferred to the extended regional trade model. Developing countries often fail to initiate litigation due to barriers of resources used for the legal process or concerns about political and economic relationships with other countries, especially developed country partners. Legalization of international trade institutions raises the costs of litigation, which requires participating countries to have greater financial capacity. Therefore, disputants suffer from costs that international dispute settlement procedures incur. Disparities in legal resources affect member countries' abilities to formally participate in litigation of the trade agreements. The amount of costs (e.g. efforts, time, and financial means) is more burdensome to developing countries than to developed countries. Previous studies show that larger and richer

countries are more likely to become complainants participating in WTO litigation.

So far, only a small portion of developing countries are involved with legal disputes under international trade regimes as both plaintiffs as well as defendants. Those countries who have participated in DSM under the WTO are Argentina, Brazil, Chile, India, Indonesia, Korea, Mexico, the Philippines, Thailand, and Venezuela. Bown (2005) finds that a state's capacity to pay for legal services, measured by GDP as a proxy, is positively associated with the decision of the state to become a complainant or interested third party. Thus, developing countries have faced more barriers to initiate legal disputes due to a lack of legal resources. Consider the dispute between the U.S. and South Korea over the issue of safeguard, US-Safeguard on Circular Welded Pipe from Korea (DS202). South Africa, Turkey, and Venezuela were also adversely affected by the U.S. safeguard. Nevertheless, only South Korea formally participated in the dispute. Due to a lack of resources, those countries might not be able to bring a case to international arbitration even with external legal assistance provided by the WTO.

The issue of disproportionality becomes more serious in RTAs that involve a small number of memberships or partnerships with larger power asymmetries. Chase et al. (2013) show that the logic of economies of scale explains why the more multilateral an international agreement is the more likely it is to be institutionalized. Additionally, most RTAs do not provide member countries with access to professional legal assistance. In comparison, WTO members gain access to legal support from trained experts through the WTO secretariat, prior to and during the dispute settlement process. The existence of such an external support could alleviate disparities in legal resources between strong and weak states. In addition to the absence of legal assistance, many RTAs do not have a standing body, rather, they call an ad-hoc panel if necessary. Formation of an ad-hoc panel requires a more substantial amount of time and financial resources than using a standing body.[23]

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[23]The WTO also has the standing Appellate Body and its operating fund.

Another issue of litigation costs in RTAs lies in the fact that in most cases the DSM costs of proceedings are shared equally by both disputants. The equal cost-sharing yields another layer of disparity in the financial burden between the strong and the weak states. This implies that a weak state even with a very strong case is afraid of paying high litigation costs without getting compensated in the event of losing the dispute. Taken all together, the design of RTA DSMs entails disparity in the burdens of its signatories attributable to the disparate allocations of financial and legal resources. The burden of legal expenses in the DSM process for a member country is denoted by $\kappa > 0$. Let κ denote the burden of litigation costs for the strong and κ^* for the weak. Given that the cost burden is inversely proportional to a state's power, we assume the following relationship: $\kappa^* > \kappa$.

Figure 4.4: Contraction of settlement strategy

Stronger party with litigation cost $\kappa > 0$
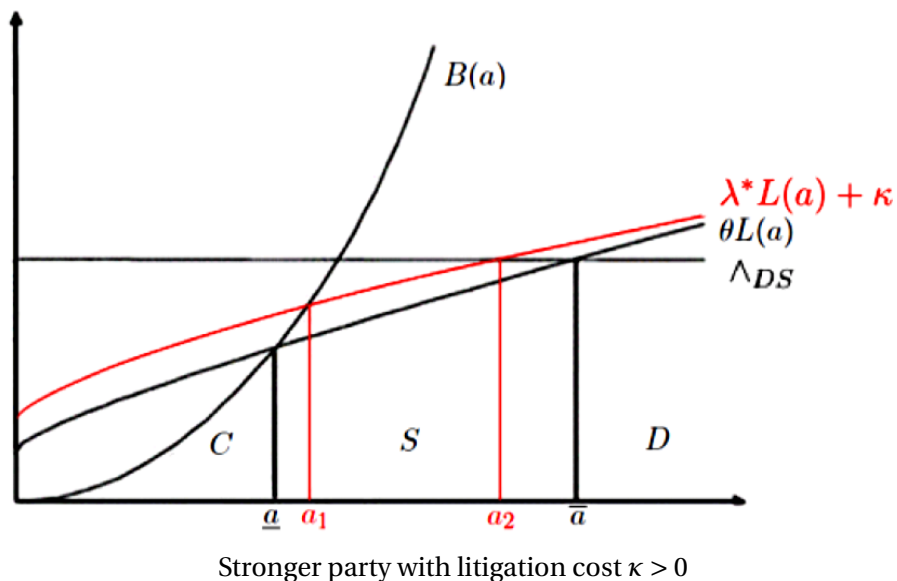
For a stronger party, those additional costs in the extended model pull up the lower bound where a player is indifferent between C and S, while pulling down the upper bound where a player is indifferent between S and D. Such changes widens both areas of C and D

Figure 4.5: Greater contraction of settlement strategy
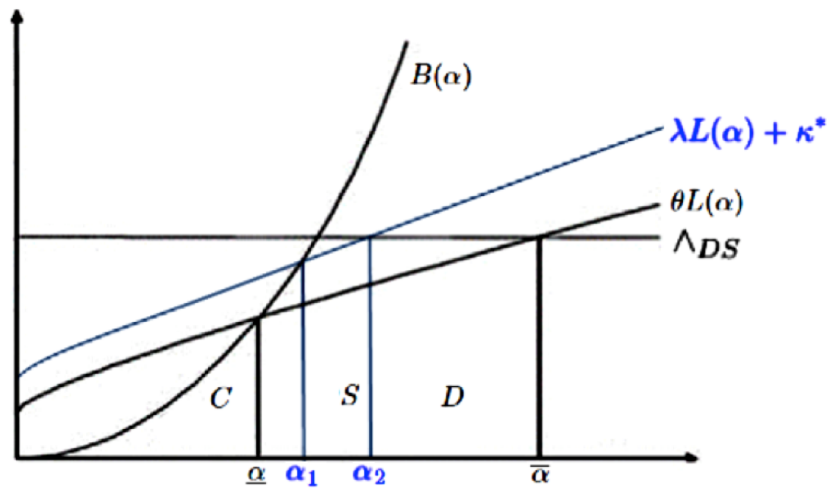
Weaker party with litigation cost $\kappa^* > \kappa$

at the expense of the region for *S*, which is described in Figure 4.4. For a weaker party, κ^* narrows down the area of settlement by dragging down the lower bound α_1 and raising the upper bound α_2 just as κ plays on the stronger party's DSS. For a weaker party, the costs burden results in a more vivid outcome, the contraction of a settlement strategy due to the shrinking effect of a large λ (Figure 4.5). Taken together, the second proposition summarizes the first central result that RTA DSMs reduce the flexibility of DSS for both players and more so for weak players.

Proposition 5 (Flexibility). *RTAs are less flexible than the WTO. All members face contraction of the areas of S. The area of S for weaker members is narrower than that of stronger members.*

Differential costs κ and κ^* narrow down the area of *S* for the DSS of both stronger and weaker parties, respectively. The magnitudes of contraction for each player by which their litigation costs vary across the probability of winning a trade dispute. Recall that in more power-based RTAs a strong state is less likely to lose a case against a weak state. In such a condition, the downsizing effect of κ for a strong state is smaller than a weak state. On the

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contrary, a weaker state is more likely to lose a case in RTAs, which exacerbates contraction of the *S* region on its DSS.

Figure 4.6: Loss of stability between the WTO and RTAs

Strong (a_2) vs. Weak (α_2)
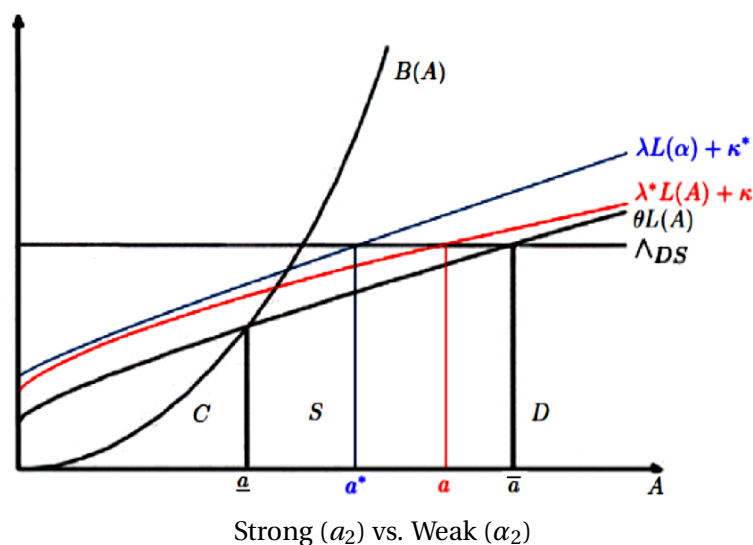
The comparison between Figure 4.4 and Figure 4.5 shows that the steeper slope λ of a weaker party's expected violation costs exacerbates the contraction of the *S* area by κ^*, while the lower slope λ^* alleviates such an effect for a stronger party. Therefore, a weaker state ends up with a much narrower range of *S* in its DSS than that of a stronger state. A decrease in the area of *S* mostly comes from an increase in the area of *D*. As Figure 4.6 describes, the defective areas for DSS of both players are expanded due to the lower level of upper cutpoints a_2 and α_2 of the strong and the weak player, respectively, than that of WTO $\hat{a}$. The disparity in the reduction of *D* exists across players, too.

Following the inequality $a_2 > \alpha_2$, a stronger player is less likely to defect without compliance than a weaker counterpart. Playing *D* comes with the breakdown of the trading system because the player leaves the system if it loses. Therefore, RTA DSMs raise the level

of the per period probability of system breakdown: RTAs are less stable than the WTO. The next proposition establishes the second central result of this paper: RTA DSMs suffer from a reduced stability of the system than does the WTO DSM.

Proposition 6 (Stability). *RTAs are less stable than the WTO. All members face an increased per period probability of breakdown which is greater for weaker members relative to stronger members.*

4.5 The Case of NAFTA

Since the North American Free Trade Agreement (NAFTA) entered into force on January 1st, 1994, the FTA has listed more than 200 disputes. However, its success is far from clear given that most cases brought to the NAFTA DSM are investor-state disputes. Most cases are disputes between investors and states regarding Chapter 11 "Settlement of Disputes between a Party and an Investor of Another Party" or Chapter 19 "Review of Final Antidumping and Countervailing Duty Determinations." The dispute settlement provisions of Chapter 20 "Institutional Arrangements and Dispute Settlement Procedures" are applicable to disputes among governments regarding the interpretation or application of NAFTA. There are only three state-to-state disputes regarding Chapter 20. The WTO to date has seventeen disputes among NAFTA members which proceeded to panel process. Compared with a total of three cases under NAFTA, it shows that the NAFTA DSM is less frequently used than the WTO DSM.

Out of the three cases under NAFTA, one case was brought by the U.S. against Canada.[24] However, the U.S. never initiated a dispute against Mexico under NAFTA; the U.S. brought a total of six cases against Mexico to the WTO instead.[25] In comparison, in 1998 and 2001

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[24]In 1996, the U.S. request consultations with Canada in the matter of "Tariffs Applied by Canada to Certain U.S. Origin Agricultural Products".

[25]The first case initiated in 1997 by the U.S. against Mexico: "Anti-Dumping Investigation of High-Fructose Corn Syrup (HFCS) from the United States" (DS101). Four of them came through the panel process.

Mexico requested consultations with the U.S. under the NAFTA DSM: "The U.S. Safeguard Action Taken on Broom Corn Brooms from Mexico" and "Cross-Border Mexican-owned Trucking Services" where Mexico prevailed. Despite a panel decision in favor of Mexico, Mexico brought eight cases against the U.S. to the WTO DSM since its experience with the NAFTA DSM.[26]

One might ask since RTA DSMs provide more flexibility to stronger countries at the expense of weaker countries, stronger countries are more likely to chooses RTAs rather than the WTO as a forum for dispute resolution. Results of the model claim that weaker countries prefer the WTO to RTAs more than stronger countries, due to the disadvantages in flexibility and stability. The results, however, also point out that both strong and weak countries suffer from losses of strategic flexibility and systemic stability. It follows that if stronger countries fear the breakdown of the trading system, they would like to use the WTO DSM rather than RTA DSMs.

Previous studies suggest other reasons for the frequent use of the WTO DSM. For example, Mexico initiated a case against the U.S. in the WTO in 2001. It was the second case brought by Mexico against the United States. Mexico was not alone in this case. Canada was the other complainant and there were thirteen third-party participants: Argentina, Australia, Brazil, Costa Rica, European Communities, Hong Kong, India, Indonesia, Israel, Japan, Korea, Norway, and Thailand. Given that Mexico waited for nearly a decade before it imposed retaliatory tariffs in March 2009 for the NAFTA trucking dispute, this large number of third parties and the unsuccessful story of enforcement through NAFTA implies that enforcement power plays a significant role in the decision of forum for dispute resolution. Recall that Mexico brought eight other cases against the U.S. to the WTO and no case to NAFTA since 2001.

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[26]There are a total nine cases brought by Mexico to the WTO. The first case initiated by Mexico in 1996, "Anti-Dumping Investigation Regarding Imports of Fresh or Chilled Tomatoes from Mexico" (DS49), did not proceed to the panel process. Six out of the total nine cases went through the panel process.

In addition to the losses in flexibility and stability in an absolute sense, strong countries have an incentive to use the WTO DSM over RTA DSMs. Studies also found that stronger states have other considerations in their choice of DSM. For example, Busch (2007) argues that RTAs allow "forum shopping" for member states who hold WTO membership; the complainants could submit the dispute to the DSM in regional or multilateral trade agreements, if they want litigation. His study of *Canada-Periodicals* and *Mexico-corn brooms* shows that the strategic choice of forum comes from the consideration of future usage of the ruling rather than the chance of winning in the current term.

Previous studies also consider different levels of enforcement and the costs of exit between the WTO and RTAs in deciding the forum for dispute resolution. From the perspective of a complainant who chooses the forum, less powerful players prefer the WTO due to its greater enforcement powers and higher exit costs compared to that of RTAs, especially against powerful opponents. These attributes help level the playing field in the WTO for less powerful players. Powerful players with greater retaliatory power against less powerful players also prefer the WTO because of not only greater enforcement from the system but also high exit costs which help prevent less powerful players from withdrawing from the system. In spite of the advantages of prevailing in cases under RTA DSMs, powerful players also have incentive to bring cases to the WTO because they consider the future usage of the ruling when deciding which forum to use. First, a case brought to the WTO is highly likely to be related to other potential disputes with other member countries. Second, a ruling is considered to be more legitimate due to its higher level of legalism as compared to RTAs.

In sum, the results of the extended model show that a weak state prefers the WTO to RTAs when it comes to a dispute against a powerful state, due to its losses in flexibility and stability. In addition, greater enforcement powers and high exit costs help less powerful members insulate themselves from power politics in the WTO more efficiently than RTAs. This implies

that powerful states also seek the WTO DSM over RTA DSMs for cases against weak states. Despite advantages in the regional setting, powerful states lean towards the WTO DSM in fear of the breakdown of the trading system. Given that powerful players consider the future usage of the ruling rather than the chance of winning in the current period, these powerful states prefer the WTO DSM to RTA DSMs because rulings under the WTO are considered to be more legitimate and related to other potential disputes. Taken together, a dispute between the strong and the weak in particular, is more likely to be brought to the WTO than RTAs.

4.6 Conclusion

The development of international trade cooperation alongside the consistent rise of global economic interdependence has driven the growth of multilateralism in the WTO. Nevertheless, the tradition of multilateral trade negotiation has more recently been replaced by RTAs since the early 1990s. To understand the dynamics of regional trade agreements and the implications for the world trade system, this paper analyzes a structural (dis)advantage of regional trade agreements to large and small economies by comparing the role of DSMs between regional and multilateral trading systems.

The extension of Rosendorff's game-theoretic model from the WTO to RTAs demonstrates that DSMs found in RTAs reinforce inequalities in the international trade system and increase systemic instability. The mechanisms of dispute resolution under RTAs grant more room for manipulating the trade agreement to stronger states. Nevertheless, weak states have less flexibility in RTA DSMs than they would have in the WTO DSM. Therefore, the WTO DSM is more efficient in leveling the playing field relative to RTA DSMs.

The strongly legalized dispute settlement mechanism increases the level of stability of the WTO by bringing flexibility into the strategies of member countries (Rosendorff, 2005). In RTAs, however, DSMs yield disparity in the extent of strategic flexibility allowed to asymmetric

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partners. This issue of inequality makes such positive effect of DSMs as in the WTO uncertain by reducing systemic stability of the regional trade agreements. Additionally, states face the loss of strategic flexibility regardless of power in RTA DSMs compared to the WTO DSM. This also indicates that RTAs are less stable than the WTO given that all members face the increased per period probability of breakdown, which suggests that the superiority of the WTO DSM provides a compelling explanation for the more frequent use of the WTO DSM than RTA DSMs.

The results imply that if there is a high chance of political pressure for trade protection and consequent high odds of defection, small and weak countries should be more careful about joining RTAs, especially with larger and stronger partners. Given that legal capacity is one of the major obstacles for poor countries to use dispute settlement mechanisms, access to external legal support available for those countries in RTAs will improve the imbalance and the disuse of dispute settlement mechanisms in RTAs. The model demonstrates that small and poor countries face increased inequality in dispute settlement under RTAs than WTOs. Despite the apparent disadvantages, small and poor countries might be interested in joining RTAs in the fear of extremely high costs of being an innocent bystander in a natural trading region unless the WTO provides them with more incentives to lower the burdens of membership and increase gains from cooperation in the multilateral trading system.

5. CONCLUSIONS

The question of why states agree to cooperate and build international institutions has long been a major topic in the field of international relations (e.g. Gilpin, 1981; Keohane, 1984; Mearsheimer, 1994). International institutions have ensured the survival of liberal international economic order and promoted cooperation and prosperity since the end of World War II. Over the last two decades, they have increasingly become more and more legalized through the development of strong dispute settlement mechanisms. Despite disadvantages and fear of dispute settlement mechanisms (e.g. limited use of power to exercise for the haves vs. high costs of litigation for the have-nots), states choose to delegate authority to international institutions to resolve their disputes. By providing an effective and impartial way to resolve disputes, dispute settlement mechanisms are fundamental to the international trading system which prevents major trade wars and sustains the global economic order.

The demise of the WTO's Appellate Body indicates that not only did increased legalization reduce the inequality of the global trade system, but the high level of legalization also posed a serious challenge to the system by putting its leadership at risk. Understanding institutional design of dispute settlement mechanisms and states' choices regarding their use of international adjudication is crucial for evaluating the role of international institutions in shaping state behavior and maintaining the global economy in the liberal order.

This dissertation focuses on the design of dispute settlement mechanisms and states' strategic choice of forum. Both the theory and empirical analysis compare the choice of institutional design of dispute settlement mechanisms over international trade regimes. In Chapter 2, I develop a game theoretic model of trade disputes and examine three different scenarios: private bargaining, GATT bargaining, and WTO bargaining. The GATT bargaining model demonstrates that the weak complainant has bargaining leverage when (1) her pow-

erful counterpart gets a substantial amount of an additional benefit from prevailing in the case in international court, and (2) her chance of winning the dispute in court exceeds her cost of litigation. When those conditions are satisfied, litigation occurs in the GATT which generates bargaining leverage for the weak complainant and increases her payoff. Given that those conditions are unlikely to be satisfied simultaneously, however, the weak complainant is unlikely to have bargaining leverage under the GATT.

Nevertheless, the WTO bargaining model predicts that the weak complainant fares well relative to bilateral bargaining regardless of occurrence of litigation. For the WTO's dispute settlement mechanism to benefit the weaker complainant, therefore, the one following condition should be met: the complainant's winning the case in litigation is greater than her cost of litigation. This result suggests that the WTO's highly legalized dispute settlement mechanism (e.g. states can no longer wield a veto) helps level the playing field for the small and weak complainants by empowering them in the early stages of dispute resolution.

This research contributes to the literature on international institutions and international adjudications by developing a game-theoretic model to explain how legal features of dispute settlement mechanisms shape state behavior and affect distributional consequences of international cooperation. The theory and findings of this research deepen our understanding of legalized dispute settlement mechanisms. A series of bargaining models demonstrates that the legal teeth of the WTO increases the size of the pie for weak complainants. Specific and firm rules supported by fair international adjudication help weak complainants insulate themselves from power politics. Nevertheless, the sheer existence of international arbitration alone, as seen in the GATT bargaining game, is not an effective means of threat by which those weak complainants do so. Despite the limitations of international institutions, this study demonstrates that legalization can effectively offer a voice to less powerful states and improve the distributional gains from cooperation.

In Chapter 3, I further explore the dispute settlement systems of the GATT and the WTO by testing three key theoretical relationships drawn from the models presented in Chapter 2. I develop a theory about litigation and third party participation to explain how increased legalization of the international trade regime empowers small and poor countries. I argue (1) disputes filed in the WTO are more likely to reach litigation than those filed in the GATT, and (2) the odds of litigation increase in the number of third parties involved. I further develop a theory about a conditional effect of WTO dispute settlement on post-dispute trade flows between disputing parties. I argue that the WTO helps poor states disproportionally. This leads to such a strong post-dispute distributional effect in the WTO that poor states restore trade over the disputed products after WTO disputes more than they could do after GATT disputes, while rich states are unlikely to experience such a trade impact from the WTO relative to the GATT. I test my arguments using original data on disputes at the GATT and the WTO from 1980 until 2018 and post-dispute trade flows for each GATT/WTO dispute filed between 1989 and 2015. Empirical evidence strongly supports my arguments.

This study contributes to the literature on the GATT/WTO disputes and legalization of dispute settlement systems, and also speaks to a broader literature on the role of international institutions. My contribution is threefold. First, this study lays out and empirically tests circumstances where legalized dispute settlement systems help small and poor countries insulate themselves from power politics in the multilateral trading system. Second, while most research relies on aggregated trade flows to examine the distributional consequences of the GATT/WTO dispute settlement, I analyze disaggregated trade data (i.e. bilateral trade flows of the affected products directly listed in the dispute) and examine the direct economic consequences of international adjudication. Third, I construct an original database for disputes at the GATT and the WTO. Compared to the existing relevant data, the coverage of my database is significantly greater in terms of number of dispute cases. To the best of my knowledge, my database is also the most fine-grained of the available data sets.

Chapter 4 analyzes a structural (dis)advantage of regional trade agreements to large and small economies by comparing dispute settlement mechanisms between regional and multilateral trade systems. The model demonstrates that in RTAs, states face losses of strategic flexibility and systemic stability, as well as disparities in the losses for asymmetric partners. The greater loss of flexibility states face in RTA DSMs compared to that in the WTO DSM will increase per period probability of breakdown and, consequently, reduce the stability of the trading system. This suggests that the frequent use of the WTO's dispute settlement system results from its superiority in avoiding system breakdown and leveling the playing field for small and poor countries.

This research contributes to the literature on regionalism and legalism in international institutions by suggesting a game-theoretic model of trade disputes in regional trade agreements compared to that in the WTO. This study highlights how the dispute settlement mechanisms of RTAs shape state behavior in response to changes in domestic politics and increase the gap in strategic choices between the strong and the weak. The results bring us to what lies at the root of the relative disuse of dispute settlement systems of RTAs despite the proliferation of regionalism.

The results have important policy implications too. Small and weak countries need to be careful joining RTAs with larger and stronger partners if there is a high chance of political pressure for protection and consequent high odds of defection. As shown in many empirical findings, access to external legal support in RTAs would reduce the inequality in dispute settlement. Given that the apparent disadvantages that small and poor countries expect to take in RTAs, the WTO should provide them with more incentives to lower the burdens of membership; they otherwise are more interested in joining RTAs not to suffer from extremely high costs of being an innocent bystander in a natural trading region.

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GATT VS. WTO ADJUDICATION

Proof of Proposition 1. I show that no player can make a profitable deviation from the proposed equilibrium strategy in one single period, i.e., one-shot deviation principle (OSDP). Consider a period when C offers. C has no profitable deviation. C cannot make an acceptable offer that will get her more than 0. And if makes an offer that will be rejected, she will get 0 the next period too. D also has no profitable deviation. If D accepts, he gets 1. If he rejects, he will get 1 the next period. Note that for any failed period, C and D receive their status quo payoffs $SQ_C = 0$ and $SQ_D = 1$, respectively. A similar argument applies to periods when D offers. Consider a period when D offers. D has no profitable deviation either. D cannot make an acceptable offer that will get him more than 1. C also has no profitable deviation. If C accepts, she gets 0. If she rejects, she will get 0 the next period. ∎

Proof of Proposition 2. I show that no player can make a profitable deviation from the proposed equilibrium strategy in one single period, i.e., one-shot deviation principle (OSDP). Suppose $b < b_{crit}$. Then D chooses to reject delegation. When C chooses to delegate, D has no profitable deviation. D receives $\frac{1}{1-\delta}$ with rejection and $\frac{\left(1-(1-a)\theta\right)(1+b)-C_D}{1-\delta}$ ($< \frac{1}{1-\delta}$ when $b < b_{crit}$) with acceptance. D has no incentive to deviate to accept when C chooses to delegate. If D offers $x_D = 1$, C always receives 0 from all three decisions: accepting, rejecting, and delegating; C has no incentive to deviate to delegate. Thus, the game is analogous to private bargaining above. The proof is straightforward, as shown above.

Suppose $b > b_{crit}$ and $(1 - a)\theta < C_C$. Then D chooses to agree on delegation and C prefers rejecting over delegating. When C chooses to delegate, D has no profitable deviation. D receives $\frac{1}{1-\delta}$ with rejection and $\frac{\left(1-(1-a)\theta\right)(1+b)-C_D}{1-\delta}$ ($\geq \frac{1}{1-\delta}$ when $b > b_{crit}$) with acceptance.

Thus, D has no incentive to deviate to reject. If D offers $x_D = 1$, C receives (1) 0 if she accepts, (2) 0 in both current and following periods if she rejects and makes an offer next period, and (3) $\frac{(1-a)\theta - C_C}{1-\delta} < 0$ when $(1-a)\theta < C_C$ if she delegates. C has no incentive to deviate to delegate; thus, the game is analogous to private bargaining in the absence of international arbitration. The proof is straightforward, as shown above.

Now suppose $b > b_{crit}$ and $(1-a)\theta > C_C$. Then D chooses to agree on delegation and C prefer delegating over rejecting. Consider a period when D offers. D has no profitable deviation. If D makes an unacceptable offer $x_D > 1 - (1-a)\theta + C_C$, delegation will occur which will give him $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$. If he makes an offer that C would accept, he would optimally choose $x_D = 1 - (1-a)\theta + C_C$. This offer gives him $\frac{1-(1-a)\theta+C_C}{1-\delta}$ which is worse than $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$ because $b > \frac{C_C+C_D}{1-(1-a)\theta}$ and $b_{crit} > \frac{C_C+C_D}{1-(1-a)\theta}$. D has no incentive to deviate to an acceptable offer $x_D \leq 1 - (1-a)\theta + C_C$. C also has no profitable deviation. If she accepts D's offer $x_D > 1 - (1-a)\theta + C_C$, her payoff is less than her payoff from delegation $\frac{(1-a)\theta - C_C}{1-\delta}$. Given that D rejects any offer C could make and C chooses to delegate in response to his offer $x_D > 1 - (1-a)\theta + C_C$, the game ends with delegation two periods later. Given C's status quo of 0 and positive discount factor, rejection makes her worse off. Thus, C has no incentive to accept or reject. If C accepts D's offer $x_D \leq 1 - (1-a)\theta + C_C$, she gets $\frac{(1-a)\theta - C_C}{1-\delta}$ at least. If she delegates, she receives $\frac{(1-a)\theta - C_C}{1-\delta}$. If she rejects, she gets $\frac{(1-a)\theta - C_C}{1-\delta}$ because the game ends with delegation two periods later. Thus, C has no incentive to deviate to reject. When C chooses to delegate, D has no profitable deviation. D receives $\frac{1}{1-\delta}$ with rejection and $\frac{\left(1-(1-a)\theta\right)(1+b)-C_D}{1-\delta}$ ($\geq \frac{1}{1-\delta}$ when $b > b_{crit}$) with acceptance. Thus, D has no incentive to deviate to reject.

Consider a period when C offers. Not only C but also D has no profitable deviation. For any offer C could make $x_C \geq 0$, If D accepts, he will receive $\frac{1}{1-\delta}$ at most. If D rejects, he will get 1 in the current failed period and $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$ from delegation in the following period. Thus, with rejection, D will receive $1 + \frac{\delta\left([1-(1-a)\theta](1+b)-C_D\right)}{1-\delta}$, which is strictly greater than $\frac{1}{1-\delta}$

because $b > b_{crit}$. Thus, D has no incentive to deviate. ∎

Proof of Proposition 3. I show that no player can make a profitable deviation from the proposed equilibrium strategy in one single period, i.e., one-shot deviation principle (OSDP). Suppose $(1 - a)\theta < C_C$. When D offers $x_D = 1$, C will receive 0 if she accepts or rejects (then she makes an offer $x_C = 0$ next period) or $\frac{(1-a)\theta - C_C}{1-\delta}$ (< 0 when $(1 - a)\theta < C_C$) if she delegates. Since C has no incentive to delegate, the game is analogous to private bargaining in the absence of international arbitration. The proof is straightforward as shown above (Proposition 1).

Suppose $(1 - a)\theta > C_C$ and $b < b_{crit'}$. Consider a period when C offers. C has no profitable deviation. C cannot make an acceptable offer that will get her more than $\frac{\delta[(1-a)\theta - C_C]}{1-\delta}$. If she makes an offer that will be rejected, she will get $\frac{(1-a)\theta - C_C}{1-\delta}$ in the next period, or in present terms $\frac{\delta[(1-a)\theta - C_C]}{1-\delta_C}$, suggesting that C has no incentive to deviate. D also has no profitable deviation. If D accepts $x_C = \delta[(1 - a)\theta - C_C]$, he gets $\frac{1-\delta[(1-a)\theta - C_C]}{1-\delta}$. If he rejects, he will get 1 the current failed period and $1 - (1 - a)\theta + C_C$ the next period. The continuation values of the two payoffs are the same $\frac{1-\delta[(1-a)\theta - C_C]}{1-\delta}$. Thus, D has no incentive to deviate to reject. Now consider a period when D offers. D has no profitable deviation. D cannot make an acceptable offer that will get him more than $\frac{1-(1-a)\theta + C_C}{1-\delta}$. If he makes an offer that C would not accept, he will get $\frac{[1-(1-a)\theta](1+b) - C_D}{1-\delta}$ from delegation, which is worse than $\frac{1-(1-a)\theta + C_C}{1-\delta}$ because $b < b_{crit'}$. Thus, D has no incentive to deviate. C also has no profitable deviation. If C accepts $x_D = 1 - (1 - a)\theta + C_C$, she gets $\frac{(1-a)\theta - C_C}{1-\delta}$. Also, she will get $\frac{(1-a)\theta - C_C}{1-\delta}$ if she delegates. If she rejects, however, she will get 0 the current failed period and $\frac{\delta[(1-a)\theta - C_C]}{1-\delta}$ the next period, or $\frac{\delta^2[(1-a)\theta - C_C]}{1-\delta}$ in present terms. Thus, C has no incentive to deviate.

Now suppose $(1 - a)\theta > C_C$ and $b > b_{crit'}$. Consider a period when C offers. C has no profitable deviation. If C makes an offer $x_C > \delta[(1 - a)\theta(1 + b) + C_D - b]$ that D would not accept, she will get $\frac{(1-a)\theta - C_C}{1-\delta}$ from delegation in the next round (i.e., $\frac{\delta\left[(1-a)\theta - C_C\right]}{1-\delta}$ in current

terms). C cannot make an acceptable offer that will get her more than $\frac{\delta\left[(1-a)\theta-C_C\right]}{1-\delta}$ because $b > b_{crit'}$. D also has no profitable deviation. If he rejects, he will get 1 the current failed period and $\frac{\left[1-(1-a)\theta\right](1+b)-C_D}{1-\delta}$ from delegation in the next period, i.e., $\frac{1-\delta\left[(1-a)\theta(1+b)+C_D-b\right]}{1-\delta}$ in current terms. If D accepts $x_C > \delta[(1-a)\theta(1+b)+C_D-b]$, he gets strictly less than $\frac{1-\delta\left[(1-a)\theta(1+b)+C_D-b\right]}{1-\delta}$. Thus, D has no incentive to deviate to accept. Now consider a period when D offers. D has no profitable deviation. If D makes an offer $x_D > 1-(1-a)\theta+C_C$ that C would not accept, he will get $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$ from international adjudication. D cannot make an acceptable offer that will get him more than $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$ because $b > b_{crit'}$. C also has no profitable deviation. If she delegates, she will get $\frac{(1-a)\theta-C_C}{1-\delta}$. If she accepts $x_D > 1-(1-a)\theta+C_C$, her payoff is obviously worse than $\frac{(1-a)\theta-C_C}{1-\delta}$. If she rejects, she will get $\frac{(1-a)\theta-C_C}{1-\delta_C}$ from international adjudication two periods later, or $\frac{\delta^2\left[(1-a)\theta-C_C\right]}{1-\delta}$ in present terms, which is strictly worse than $\frac{(1-a)\theta-C_C}{1-\delta}$ because $\delta \in (0,1)$. Thus, Both C and D have no incentive to deviate. $\blacksquare$

APPENDIX B

AN EMPIRICAL ANALYSIS

B.1   Data Sources and Summaries

Complainant countries: Antigua and Barbuda, Argentina, Australia, Austria, Bangladesh, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Cuba, Czech Republic, Denmark, Dominican Republic, EU, Ecuador, El Salvador, Finland, Guatemala, Honduras, Hong Kong, Hungary, India, Indonesia, Japan, Korea, Malaysia, Mexico, Moldova, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Russia, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, UAE, USA, Ukraine, United Kingdom, Uruguay, Venezuela, Vietnam, Zimbabwe.

Defendant countries: Argentina, Armenia, Australia , Austria, Bahrain, Belgium, Brazil, Canada, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, EU, Ecuador, Egypt, Finland, France, Germany, Greece, Guatemala, Hungary, India, Indonesia, Ireland, Italy, Japan, Kazakhstan, Korea, Kyrgyzstan, Malaysia, Mexico, Moldova, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Slovak Republic, South Africa, Spain, Sweden, Switzerland, Thailand, Trinidad and Tobago, Turkey, UAE, USA, Ukraine, United Kingdom, Uruguay, Venezuela.

Third Parties: Afghanistan, Argentina, Australia, Bahrain, Bangladesh Barbados, Belize, Benin, Bolivia, Brazil, Cameroon, Canada, Chad, Chile, China, Colombia, Costa Rica, Cote

d'Ivoire, Cuba, Dominican Republic, EU, Ecuador, Egypt, El Salvador, Fiji, Finland, Ghana, Grenada, Guatemala, Guyana, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Japan, Kazakhstan, Kenya, Korea, Kuwait, Madagascar, Malaysia, Malawi, Mauritius, Mexico, Moldova, Namibia, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Qatar, Russia, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Singapore, South Africa, Sri Lanka, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, UAE, USA, Ukraine, Uruguay, Venezuela, Vietnam, Yemen, Yugoslavia, Zambia, Zimbabwe.

B.2 Tables

Table B.1: Summary Statistics (Dispute-level analysis)

Variable	Mean	Std. Dev.	Min.	Max.	N
Ruling circulated	0.46	0.5	0	1	390
Ruling circulated & adopted	0.38	0.49	0	1	390
Panel established	0.58	0.49	0	1	390
WTO	0.71	0.45	0	1	390
Number of third parties	3.91	6.26	0	35	390
Complainant GDP (log)	27.28	1.75	20.74	30.43	390
Complainant income PC (log)	9.23	1.24	0	11.21	382
Complainant GDPPC (log)	9.4	1.23	6.05	11.43	390
Complainant population (log)	17.91	1.69	11.28	21.05	390
Complainant polity	6.99	5.11	-10	10	387
Defendant GDP (log)	29.5	1.32	24.31	30.81	390
Defendant income PC (log)	10.04	0.8	6.41	12.03	390
Defendant GDPPC (log)	10.22	0.78	6.59	12.28	390
Defendant population (log)	19.31	0.96	16	21.05	390
Defendant polity	8.75	3.59	-10	10	390

Table B.2: Correlation Matrix (Dispute-level analysis)

Variables	0	1	2	3	4	5	6	7	8	9	10	11	12	12	14
0. Ruling circulated	1.00														
1. Ruling circulated & adopted	0.84	1.00													
	(0.00)														
2. Panel established	0.78	0.66	1.00												
	(0.00)	(0.00)													
3. WTO	0.13	0.17	0.19	1.00											
	(0.01)	(0.00)	(0.00)												
4. Number of third parties	0.43	0.39	0.51	0.35	1.00										
	(0.00)	(0.00)	(0.00)	(0.00)											
5. Complainant GDP (log)	0.04	0.07	0.10	-0.01	-0.04	1.00									
	(0.48)	(0.20)	(0.04)	(0.91)	(0.44)										
6. Complainant income PC (log)	-0.01	-0.04	0.05	-0.20	-0.10	0.39	1.00								
	(0.79)	(0.42)	(0.37)	(0.00)	(0.06)	(0.00)									
7. Complainant GDPPC (log)	-0.00	-0.02	0.07	-0.19	-0.07	0.41	0.94	1.00							
	(0.97)	(0.67)	(0.16)	(0.00)	(0.16)	(0.00)	(0.00)								
8. Complainant population (log)	0.05	0.09	0.06	0.11	0.02	0.74	-0.30	-0.29	1.00						
	(0.36)	(0.09)	(0.25)	(0.03)	(0.75)	(0.00)	(0.00)	(0.00)							
9.Complainant polity	0.00	-0.01	-0.07	-0.12	-0.19	0.04	0.35	0.35	-0.23	1.00					
	(0.94)	(0.89)	(0.19)	(0.02)	(0.00)	(0.47)	(0.00)	(0.00)	(0.00)						
10. Defendant GDP (log)	0.08	0.04	0.11	-0.05	-0.06	0.56	0.24	0.23	0.42	-0.01	1.00				
	(0.13)	(0.44)	(0.03)	(0.32)	(0.20)	(0.00)	(0.00)	(0.00)	(0.00)	(0.80)					
11. Defendant income PC (log)	0.09	0.04	0.18	0.00	0.10	0.39	0.13	0.14	0.30	-0.11	0.70	1.00			
	(0.08)	(0.45)	(0.00)	(0.99)	(0.05)	(0.00)	(0.01)	(0.01)	(0.00)	(0.03)	(0.00)				
12. Defendant GDPPC (log)	0.08	0.03	0.18	0.00	0.11	0.39	0.13	0.14	0.30	-0.11	0.70	1.00	1.00		
	(0.10)	(0.51)	(0.00)	(0.95)	(0.04)	(0.00)	(0.01)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)			
13. Defendant population (log)	0.02	0.01	-0.01	-0.08	-0.19	0.49	0.23	0.21	0.35	0.07	0.83	0.21	0.21	1.00	
	(0.71)	(0.79)	(0.79)	(0.13)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.18)	(0.00)	(0.00)	(0.00)		
14. Defendant polity	0.11	0.07	0.06	-0.19	-0.08	0.09	0.01	-0.01	0.10	0.16	0.31	0.51	0.50	0.03	1.00
	(0.03)	(0.18)	(0.22)	(0.00)	(0.10)	(0.08)	(0.84)	(0.87)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.56)	

Table B.3: Summary Statistics (Dispute-dyad-year-level analysis)

Variable	Mean	Std. Dev.	Min.	Max.	N
Post-dispute imports (log)	11.37	3.03	-1.1	17.74	740
WTO	0.58	0.49	0	1	5588
Complainant GDP (log)	27.17	1.82	20.68	30.51	5453
Complainant income PC (log)	9.52	0.94	0	11.23	5370
Complainant polity	7.9	3.83	-10	10	5445
Defendant GDP (log)	29.72	1.13	24.31	30.51	5453
Defendant income PC (log)	10.23	0.51	7.84	10.8	5453
Defendant polity	9.32	2.5	-10	10	5452
Prior imports (log)	10.97	3.22	1.57	17.73	1562
Total imports (log)	16.38	2.5	0.82	20.01	4992

Table B.4: Summary Statistics (Dispute-dyad-year-level analysis), Full sample

Variable	Mean	Std. Dev.	Min.	Max.	N
Post-dispute imports (log)	11.48	2.96	-1.1	17.74	1335
WTO	0.66	0.47	0	1	10326
Complainant GDP (log)	28.21	2.01	20.68	30.51	9911
Complainant income PC (log)	9.80	0.88	0	11.23	9826
Complainant polity	8.57	3.17	-10	10	9966
Defendant GDP (log)	28.81	1.73	22.56	30.51	10018
Defendant income PC (log)	9.95	0.82	0	11.23	9977
Defendant polity	8.65	3.48	-10	10	10021
Prior imports (log)	11.22	3.07	1.57	17.73	2622
Total imports (log)	16.44	2.41	-0.76	20.01	9228

Table B.5: Correlation Matrix (Dispute-dyad-year-level analysis)

Variables	0	1	2	3	4	5	6	7	8	9
0. Post-dispute imports (log)	1.00									
1. WTO	0.03	1.00								
	(0.41)									
2. Complainant GDP (log)	0.34	0.03	1.00							
	(0.00)	(0.03)								
3. Complainant income PC (log)	0.15	-0.19	0.53	1.00						
	(0.00)	(0.00)	(0.00)							
4. Complainant polity	-0.17	-0.12	0.16	0.42	1.00					
	(0.00)	(0.00)	(0.00)	(0.00)						
5. Defendant GDP (log)	0.37	-0.07	0.39	0.20	0.01	1.00				
	(0.00)	(0.00)	(0.00)	(0.00)	(0.41)					
6. Defendant income PC (log)	0.38	-0.03	0.28	0.15	-0.03	0.68	1.00			
	(0.00)	(0.03)	(0.00)	(0.00)	(0.02)	(0.00)				
7. Defendant polity	0.14	-0.21	0.05	0.05	0.09	0.27	0.54	1.00		
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
8. Prior imports (log)	0.82	0.05	0.15	0.08	-0.15	0.26	0.32	0.09	1.00	
	(0.00)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
9. Total imports (log)	0.45	0.05	0.82	0.49	0.06	0.63	0.51	0.18	0.32	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

**Table B.6:** Correlation Matrix (Dispute-dyad-year-level analysis), Full sample

Variables	0	1	2	3	4	5	6	7	8	9
0. Post-dispute imports (log)	1.00									
1. WTO	0.06	1.00								
	(0.02)									
2. Complainant GDP (log)	0.28	0.07	1.00							
	(0.00)	(0.00)								
3. Complainant income PC (log)	0.16	-0.08	0.65	1.00						
	(0.00)	(0.00)	(0.00)							
4. Complainant polity	-0.09	-0.07	0.29	0.46	1.00					
	(0.00)	(0.00)	(0.00)	(0.00)						
5. Defendant GDP (log)	0.36	-0.20	-0.01	0.01	-0.07	1.00				
	(0.00)	(0.00)	(0.40)	(0.17)	(0.00)					
6. Defendant income PC (log)	0.18	-0.24	-0.03	0.01	-0.05	0.60	1.00			
	(0.00)	(0.00)	(0.00)	(0.33)	(0.00)	(0.00)				
7. Defendant polity	0.05	-0.23	-0.12	-0.08	0.03	0.17	0.50	1.00		
	(0.10)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
8. Prior imports (log)	0.85	0.06	0.21	0.14	-0.06	0.27	0.17	-0.01	1.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.65)		
9. Total imports (log)	0.49	-0.03	0.68	0.49	0.13	0.58	0.38	0.05	0.42	1.00
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

B.3 Figures

Figure B.1: Number of Litigation (Ruling issued)
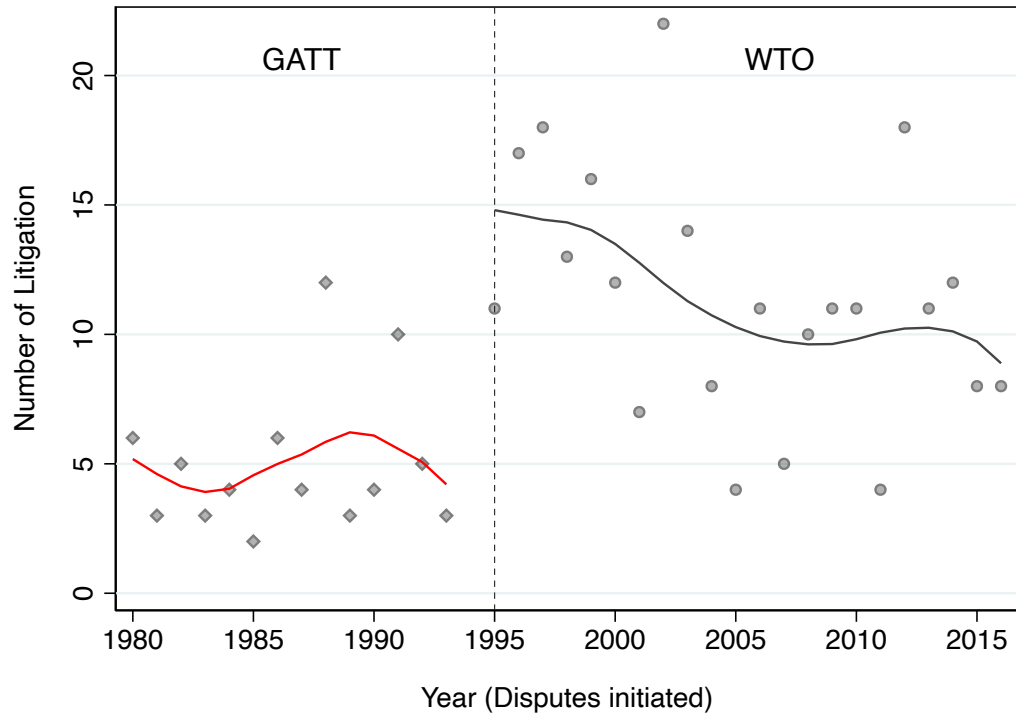
Figure B.2: Marginal effect of the WTO by the complainant's GDP (Model 4, Table 3.3)
- Full sample -
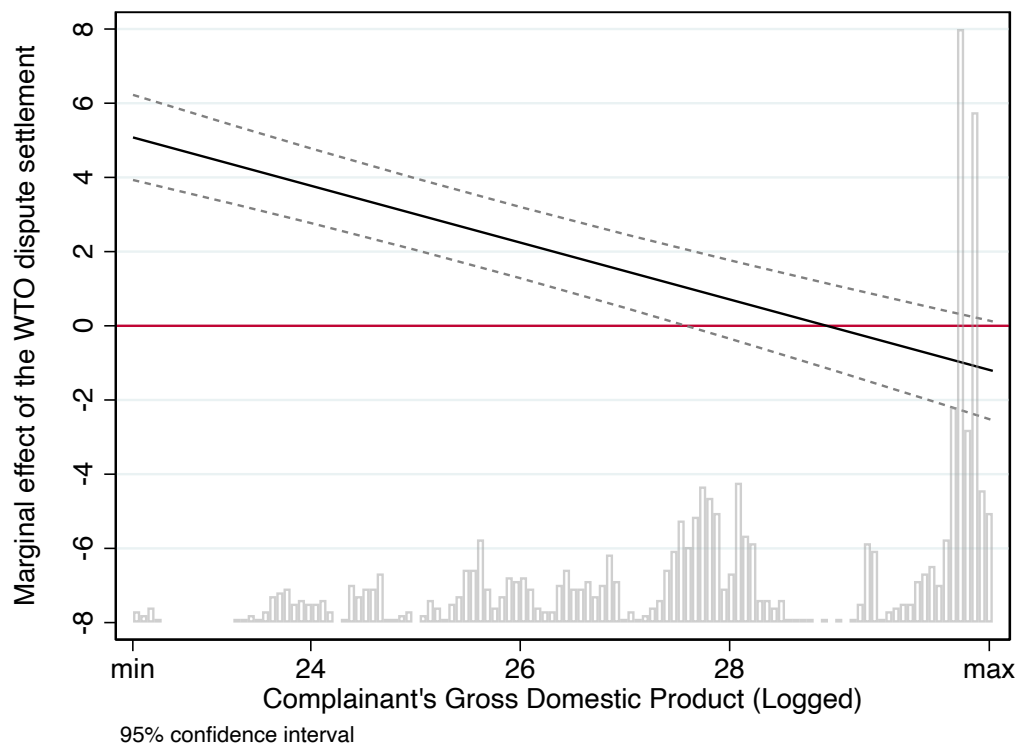
APPENDIX C

REGIONAL TRADE AGREEMENTS VS. THE WTO

Lemma 1. *Define a^* such that $B(a^*) = \wedge_{DS}$. Then $\underline{a} \le a^*$.*

Proof. $B(a^*) = \wedge_{DS}$; then $\theta L(\bar{a}) = \wedge_{DS} = B(a^*)$. Since $\bar{a} > \underline{a}$ by **Lemma 3** in Rosendorff (2005), $\theta L(\bar{a}) > \theta L(\underline{a})$. Therefore, $a^* \ge \underline{a}$. ∎

Lemma 2. *Define $f(a) = B(a) - \theta L(a)$. Then $\bar{a} \ge a^*$.*

Proof. $f(a) = B(a) - \theta L(a)$; then $f''(a) = B''(a) - \theta L''(a) > 0$. And $f(\underline{a}) = B(\underline{a}) - \theta L(\underline{a}) = 0$. Let a_1 and a_2 be $a_2 > a_1 \ge \underline{a}$. Then, $\frac{f(a_2) - f(a_1)}{a_2 - a_1} > \frac{f(\underline{a}) - f(0)}{\underline{a} - 0} = \frac{\theta L(0)}{\underline{a}} \ge 0$. $f(a)$ is convex because $f(a_1) < f(a_2)$ and $f''(a) > 0$. Hence, $f(a)$ is increasing over the range of $a \ge \underline{a}$. Now, $f(a^*) = B(a^*) - \theta L(a^*) \ge f(\underline{a}) = 0$; then $\wedge_{DS} \ge \theta L(a^*)$. $\theta L(\bar{a}) = \wedge_{DS} \ge \theta L(a^*)$. Therefore, $\bar{a} \ge a^*$. ∎

Assumption. $\lambda^* \le \frac{\wedge_{DS} - \kappa}{L(a^*)}$ from Rosendorff's assumption on $\theta \le \min\{\frac{\wedge_{DS}}{L(\bar{a})}, \frac{\wedge_{DS}}{L(\underline{a})}\}$.

Note that $\wedge_{DS} - \kappa > 0$; also $\wedge_{DS} \le \kappa + L(\bar{a})$. The maximum level of cost to stay in a treaty is the cost of the dispute procedure with the maximum level of compensation. These costs for a state not to leave the treaty should be greater than the difference of the expected benefit from playing the "cooperate" strategy, including C and S, and that of defecting once with the entire exit. If the maximum costs of being in the treaty are smaller than the gain of the state from being a cooperative player, the state will never leave the treaty because it gains more when it cooperates and will even pay the maximum amount of penalty for its temporary defection than choose to defect once followed by exit.

Now, we divide our problem into two cases: (1) $\frac{\wedge_{DS} - \kappa}{L(\bar{a})} \le \lambda^* \le \frac{\wedge_{DS} - \kappa}{L(a^*)}$, and (2) $\lambda^* \le \frac{\wedge_{DS} - \kappa}{L(\bar{a})} \le \frac{\wedge_{DS} - \kappa}{L(a^*)}$.

Note that $\wedge_{DS} - \kappa > 0$. From the assumption $\wedge_{DS} \leq \kappa + L(\bar{a})$; then $\frac{\wedge_{DS} - \kappa}{L(\bar{a})} \leq 1$. Also note that $L(a^*) < L(\bar{a})$ by Lemma 2 which shows that $a^* \leq \bar{a}$.

Lemma 3. $\lambda^* L(a^*) + \kappa \leq \wedge_{DS} \leq \lambda^* L(\bar{a}) + \kappa$.

Proof. In the first case of $\frac{\wedge_{DS} - \kappa}{L(\bar{a})} \leq \lambda^* \leq \frac{\wedge_{DS} - \kappa}{L(a^*)}$. ∎

Lemma 4. $\lambda^* L(\bar{a}) + \kappa \leq \wedge_{DS}$ and $\lambda^* L(a^*) + \kappa \leq \wedge_{DS}$.

Proof. In the second case of $\lambda^* \leq \frac{\wedge_{DS} - \kappa}{L(\bar{a})} \leq \frac{\wedge_{DS} - \kappa}{L(a^*)}$. ∎

Assumption. $\lambda \leq \frac{\wedge_{DS} - \kappa^*}{L(\alpha^*)}$. Note that $\wedge_{DS} - \kappa^* > 0$ from Rosendorff's assumption on $\theta \leq \min\{\frac{\wedge_{DS}}{L(\bar{a})}, \frac{\wedge_{DS}}{L(\underline{a})}\}$.

Lemma 5. $\lambda L(\alpha^*) + \kappa^* \leq B(\alpha^*) = \wedge_{DS}$.

Proof of Proposition 1. Given that the weaker party is playing a DSS, we must show that playing the DSS satisfies the no-defect condition for the stronger party. Given the current period draw $\hat{a}$, the expected current period return from defection for the stronger is $D(\hat{a}) - \kappa$, and hence the gain from defection for the stronger are $D(\hat{a}) - \kappa - max(C(\hat{a}), D(\hat{a}) - \lambda^* L(\hat{a}) - \kappa) = \min(B(\hat{a}) - \kappa, \lambda^* L(\hat{a})) = \min(B(\hat{a}), \lambda^* L(\hat{a}) + \kappa)$. ∎

Consider the event in which a deviation has been observed in some period. From then, the one-shot Nash strategies are played, yielding the Nash payoff (in expectation, because the draws in the future periods are unknown) forever. That is, the aggregate Nash is payoff $V_D = \frac{1}{1-\delta}(N - \kappa)$. What is the foregone cooperative aggregate payoff? If cooperation occurred in the last period, in the next each player has the option of cooperating again, or defection. Then the value of the game in a cooperative phase is the earning from the play in that period,

plus the continuation value: for a stronger party,

$$V = p \left[\, p \,(C + \delta V) + (1 - p)(S + \lambda L - \kappa + \delta V)\,\right]$$

$$+ (1 - p)\left[\, p \,(D - \lambda^* L - \kappa + \delta V) + (1 - p)(N + \lambda L - \lambda^* L - \kappa + \delta V)\,\right]$$

Solving, we have $V = \frac{1}{1-\delta}\left[\, p^2 \,(C - S - D + N) + p(D - 2N + S) + N - \kappa + (1 - p)(\lambda L - \lambda^* L) + p^2 \kappa\right]$. Hence, $V - V_D = \frac{1}{1-\delta}\left[\, p^2 \,(C - S - D + N) + p(D - 2N + S) + (1 - p)(\lambda - \lambda^*)L + p^2 \kappa\right]$. The no-defect condition in any period after $\hat{a}$ is observed (and punishment starts in the next period) is $\min(B(\hat{a}), \lambda^* L(\hat{a}) + \kappa) < \frac{\delta}{1-\delta}\left[\, p^2 \,(C - S - D + N) + p(D - 2N + S) + (1 - p)(\lambda - \lambda^*)L + p^2 \kappa\right]$ or $\hat{a} < a_2$.

If $\hat{a} < a_1 < a_2$, then $B(\hat{a}) < \lambda^* L(\hat{a}) + \kappa$ and the benefits of defection are too small to make either pure defection or use of the dispute settlement mechanism worthwhile: if $a_1 < \hat{a} < a_2$, the benefits of the DSM outweigh pure cooperation, but it is still intertemporally optimal to voluntarily pay the proportionality penalty to benefit from the possibility of cooperation in the next period. The no-defect condition is violated when $\hat{a} > a_2$; then the gains from pure defection, and the Nash reversion play from then on are preferred to cooperation. Hence, a pair of DSSs is an equilibrium. ∎

Proof of Proposition 2.

We need to show $\bar{a}_w - \underline{a}_w < \bar{a}_s - \underline{a}_s$ where $\bar{a}_w = \alpha_2$, $\underline{a}_w = \alpha_1$, $\bar{a}_s = a_2$, and $\underline{a}_s = a_1$. The following proof of Proposition 3 shows that $\bar{a}_w < \bar{a}_s$. Given $B' > \wedge_{DS}'$, $\underline{a}_s - \underline{a}_w < \bar{a}_s - \bar{a}_w$.

Proof of Proposition 3.

We need to show $\bar{a} - a_s \leq \bar{a} - a_w$ where $a_s = a_2$, and $a_w = \alpha_2$. $\lambda L(a_w) + \kappa^* = \wedge_{DS} = \lambda^* L(a_s) + \kappa$. From the assumption $\kappa^* > \kappa$, $\lambda L(a_w) \leq \lambda^* L(a_s)$; then $L(a_w) \leq L(a_s)$ by the assumption $\lambda > \lambda^*$. Now $L' > 0$, so $a_w \leq a_s$. ∎