

Legalization of International Institutions and Its Discontents: GATT vs. WTO Adjudication, 1989-2015

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January, 2021

Abstract

Many international organizations and multilateral negotiations are criticized as being driven by power politics, which disadvantages less powerful members. Does legalization of international institutions help mitigate power asymmetries and the unequal distribution of the benefits of international cooperation? I answer this question in the context of the transition from the GATT to the WTO dispute settlement mechanism (DSM). Drawing on both game theory and empirical analysis, this paper explores whether the WTO helps weak and poor countries when it comes to disputes with their more powerful counterparts. I argue that the legal features of the WTO DSM strengthen the bargaining power of weaker complainants. As a result, they have fared better under the WTO than they do under the GATT. In addition to that, I argue that the WTO helps smaller and poorer complainants disproportionately. The WTO provides poorer and smaller complainants with more gains in trade flows relative to richer and larger complainant countries. I test the argument using an original data set on post-dispute trade flows of the disputed products directly listed in each GATT and WTO dispute filed between 1989 and 2015. I show that small and poor complainants are more likely than large and rich complainants to increase their exports of the disputed products to the defendant's market after the dispute ends in the WTO relative to the GATT. I also find that the richest complainants (top 2% of the sample) will decrease their post-dispute exports to the defendant in the WTO relative to the GATT.

Word Count— 250 (abstract), approx. 9,476 (manuscript)

Keywords— International Organization, WTO, GATT, Dispute Settlement, Power Asymmetries

1 Introduction

Many scholars criticize international organizations and multilateral negotiations, arguing that they are driven by power politics (e.g. Stone, 2011; Vreeland, 2007; Brutger and Morse, 2015).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 legalized³ 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 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 capacity⁵ and retaliatory power against powerful counterparts, legalized international institutions are merely responsive to powerful states.⁶

¹As 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).

²Jamaica 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.

³Legalization 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).

⁴Notable 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).

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

⁶There are competing views on the creation of legalized international institutions associated with these different

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? 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 et al., 2014). Some argue that the strongly legalized dispute settlement system of the WTO provides a more level playing field (e.g. Horn et al., 1999). For example, strengthening the rule of law in multilateral trade regimes raises the costs of defection, which leads to cooperative behavior (e.g. Sattler et al., 2014; Baccini and Kim, 2012; Busch and Reinhardt, 2000). 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, 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.⁷ Panel rulings,⁸ 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

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, Thompson 2007; Goldstein and Steinberg 2008; Pelc 2010; and Stone 2011.

⁷For a critical review of WTO DSM practice, see Hudec 1999; and Zimmermann 2005.

⁸Panel rulings clarify rules and pressure violating parties to lift illegitimate trade barriers

losing party is allowed to block or veto the adoption of a panel report.⁹ In sum, as noted by Lacarte-Muro and Gappah, “*right* perseveres over *might*” under the WTO DSM.¹⁰

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. I develop a game theoretic model of bargaining over trade disputes and 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 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.

The model further demonstrates 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) disproportionately. In other words, poorer and smaller countries continue to promote trade of affected products after WTO disputes more than they could do after GATT disputes, while richer and larger countries are unlikely to do so. I test this empirical implication using an original data set on post-dispute trade flows for each dispute brought to the GATT and the WTO between 1989 and 2015.

My 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. This 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 powerful counterparts.

⁹For an excellent overview about the differences between the DSM of the GATT and the WTO, see Busch and Reinhardt 2003a. On the differences in the panel procedures, specifically, see Kantchevski 2006.

¹⁰Lacarte-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).

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. The bargaining models over trade disputes demonstrate that small and poor complainants gain more from a dispute under the WTO relative to a dispute under the GATT due to the structural advantages of the WTO DSM granted to complainants. Also, this paper highlights the effect of legalized WTO DSM varies by the complainant's market power. Specifically, WTO dispute has a positive effect on post-dispute trade flows of affected products for poorer and smaller complainants, but this effect becomes less positive as they become richer and larger. In other words, smaller and poorer complainant countries continue to promote trade of affected products after WTO disputes more than they could do after GATT disputes, while richer and larger countries are unlikely to do so.

Second, while most research relies on aggregated trade flows to examine the distributional consequences of the GATT/WTO dispute settlement, I examine the direct economic consequences of international adjudication using disaggregated trade data (i.e. bilateral trade flows of the affected products directly listed in the dispute). Third, I construct an original database for disputes at the GATT/WTO. Compared to the existing relevant data, the coverage of my database is significantly greater in terms of number of dispute cases by including GATT disputes and more recent WTO cases. To the best of my knowledge, the database is also the most fine-grained of the available data sets which cover both the GATT and WTO disputes.

In sum, the theory and findings of this paper deepen our understanding of the distributional consequences of legalization on international institutions by developing a game-theoretic model and testing the key result using the original product-level bilateral trade data set.

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. Maggi, 1999; Keohane et al., 2000). 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. Smith, 2000; Goldstein et al., 2000; Chaudoin, 2010).¹¹ Previous studies identify various mechanisms by which the DSM shapes state behavior including increasing the costs of defection (e.g. Smith, 2000; Goldstein et al., 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. Rosendorff, 2005; Fearon, 1998).¹² Recent studies also assess how domestic politics shapes state behavior under the legal dispute system of multilateral negotiations (e.g. leader turnover,¹³ audience costs,¹⁴ and domestic institutions¹⁵).

In the meantime, a growing literature began to take legalization into consideration and to argue that legalized institutions fail to meet expectations. 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. Simmons, 2014; Goldstein and Martin, 2000). Poor and small countries have fared worse in

¹¹In the international law literature, there is “a particularly warm, if not enthusiastic, welcome” for the WTO DSM (Zimmermann, 2005, 35).

¹²Rosendorff (2005) considers the WTO DSM as an insurance against domestic fluctuations, which leads to an increase in systemic stability of the multilateral trading system.

¹³See Bobick and Smith 2013.

¹⁴See Allee and Huth 2006; and Chaudoin 2014.

¹⁵See Betz 2018; Betz and Kerner 2016; and Peritz 2017.

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.¹⁶

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 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.

My 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.

¹⁶There 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).

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.¹⁷ 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, 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.¹⁸

A majority of GATT/WTO disputes filed never proceed beyond the consultation stage or a panel ruling.¹⁹ Nevertheless, previous works largely focus on initiation, panel proceedings, and

¹⁷The 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.

¹⁸Other 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.

¹⁹Another 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

the aftermath of panel/AB rulings, leaving private settlements prior to a ruling understudied in this literature.²⁰ 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 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. All cases which end with no ruling and full concessions are coded as 1 and all other cases are coded as 0. 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. Manzini and Mariotti, 2004; Fang, 2010). Gilligan et al. (2010) emphasize the role of the GATT/WTO DSM in providing

formation of a panel; and “no less than 35 percent of all disputes” are abandoned (Chaudoin et al., 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.

²⁰Various 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).

information to disputing parties.²¹ 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 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.²² 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

²¹ Similarly, Carrubba 2009, 2005; and Johns and Rosendorff 2009.

²² Note that any member (possibly the losing party) blocks the adoption of a panel report.

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.²³

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 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 (2003a) 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.²⁴

²³It 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.

²⁴For the sake of simplicity, the model does not capture different stages of litigation such as panel establishment, panel ruling, and AB ruling.

4 The Model

Consider the following standard alternating-offer bargaining setting, as in Rubinstein.²⁵ Two countries, C (Complainant, henceforth “she”) and D (Defendant, henceforth “he”),²⁶ 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 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 .²⁷ Both players discount their future payoffs by a common discount factor $\delta \in (0, 1)$.

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.²⁸ 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 $\left(\frac{x_C^t}{1-\delta}, \frac{1-x_C^t}{1-\delta}\right)$.²⁹ If an agreement is made in any 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

²⁵See Rubinstein 1982.

²⁶For 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).

²⁷In Rubinstein’s bargaining model, the status quo of each player is set to zero for both players.

²⁸The 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.

²⁹Note 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 gives D $(1 + \delta + \delta^2 + \dots + \delta^{t-1}) + \delta^t(1 - x_C^t) + \delta^{t+1}(1 - x_C^t) + \delta^{t+2}(1 - x_C^t) + \dots = \frac{1-\delta^t}{1-\delta} + \frac{\delta^t(1-x_C^t)}{1-\delta} = \frac{1-\delta^t x_C^t}{1-\delta}$. Note that following a formula to calculate the sum of the first t terms of a geometric sequence, $1 + \delta + \delta^2 + \dots + \delta^{t-1}$ is $\frac{1-\delta^t}{1-\delta}$.

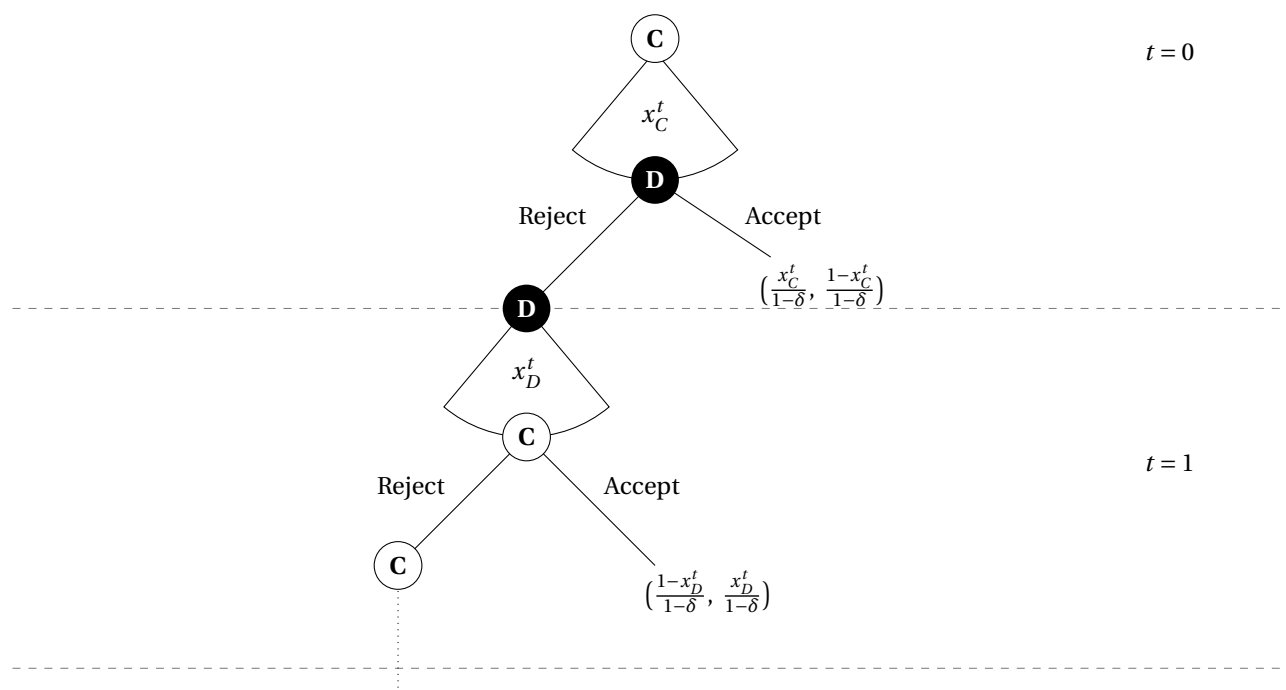
Figure 1: Private bargaining model in trade disputes

Figure 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.

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,³⁰ 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.³¹ Without D 's agreement, international adjudication fails to occur and the game ends with status quo payoffs $(0, \frac{1}{1-\delta})$. If D accepts, private bargaining ends, and the case proceeds to litigation. If international adjudication takes place, then the outcome is a 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 ,³² $\theta \in (0, 1)$ is the merits of C 's case,³³ and $b > 0$ is an additional small benefit to D if he prevails in international courts.³⁴ 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 $(\frac{(1-a)\theta - C_C}{1-\delta}, \frac{[1-(1-a)\theta](1+b) - C_D}{1-\delta})$. Figure 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 $b < b_{crit}$,³⁵ $\forall a \in (0, 1)$ whenever D proposes, he offers $x_D = 1$, accepts $x_C = 0$, and rejects*

³⁰The GATT/WTO bargaining game refers to the alternating-offers bargaining model with institutional features of the GATT/WTO.

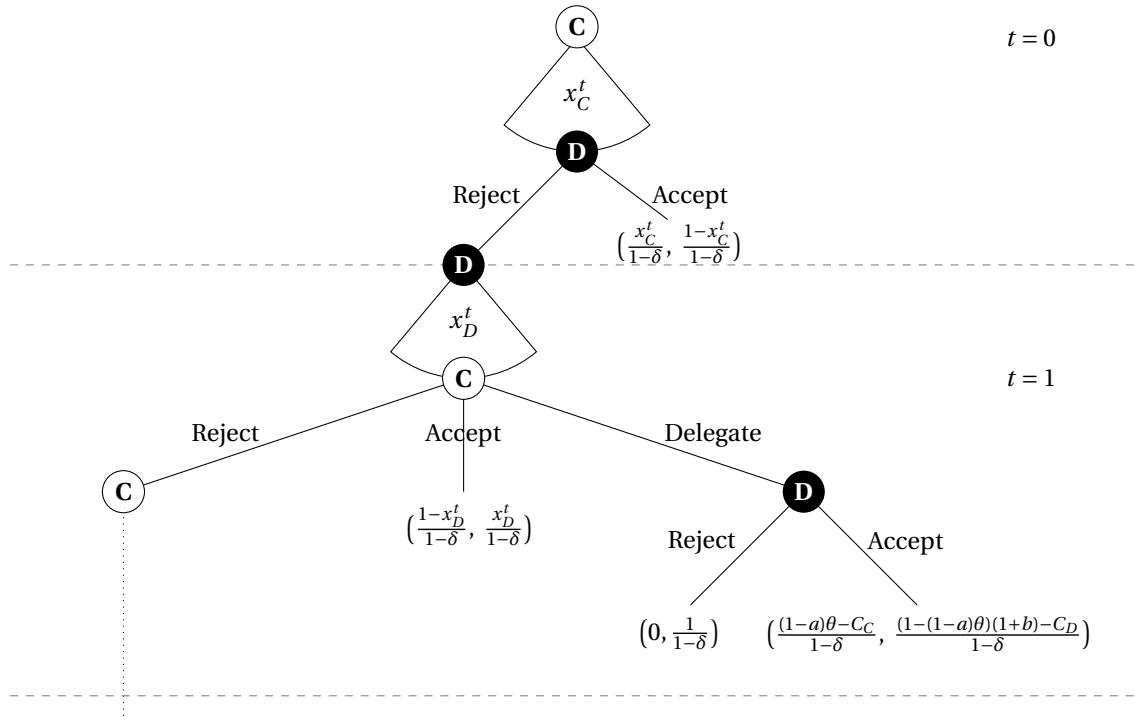
³¹In practice, there are two ways for D to reject C 's proposal of delegation: (1) reject C 's request of panel establishment, and (2) reject the adoption of panel reports. The bargaining model in this paper does not differentiate them; rather, delegation refers to the direct loss of state control over the issue.

³²Given 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.

³³This captures to what extent a defendant's violating behavior harms the interests of the complainant.

³⁴There 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.

³⁵If $b = b_{crit}$, then D is indifferent between rejecting and accepting delegation C proposes. I will ignore this knife-edge condition which is uninteresting.

Figure 2: GATT bargaining model

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 $x_D > 1 - (1-a)\theta + C_C$, 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 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 $(1 - a)\theta - C_C$.

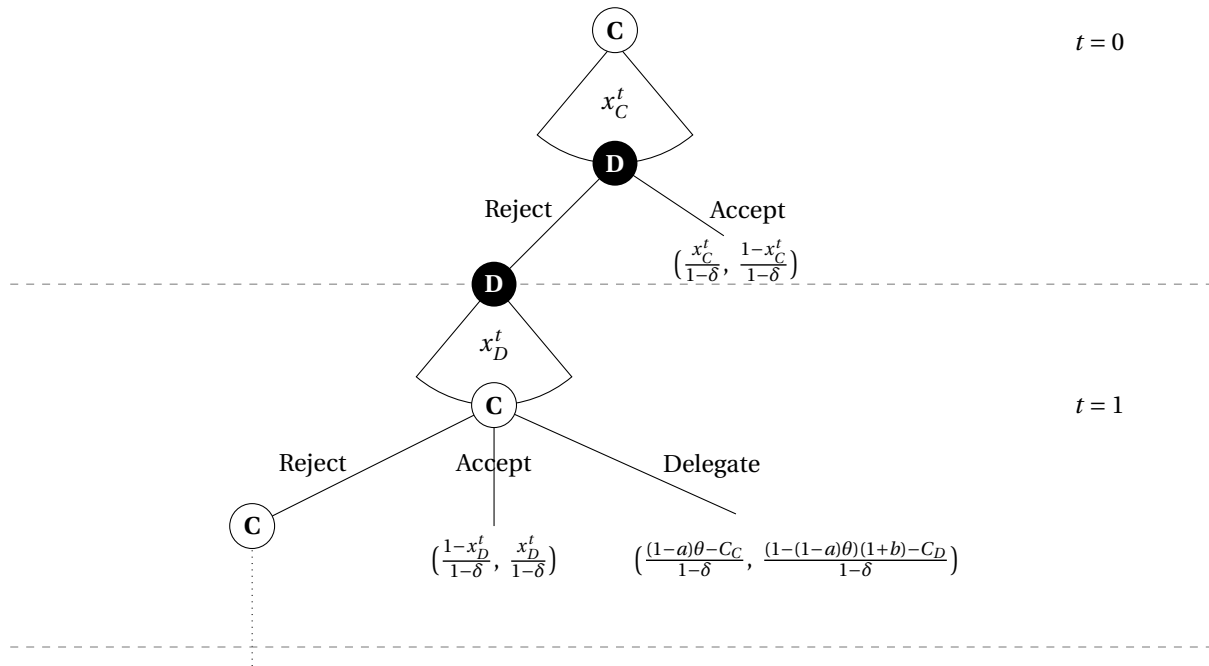
Thus, under the GATT C has bargaining leverage if and only if $b > b_{crit}$ and $(1 - a)\theta > C_C$ both hold: b is high enough that D would accept delegation, and C 's probability of winning the dispute exceeds her cost of litigation. But note that b_{crit} is strictly increasing in C 's probability 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 differenti-

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

Figure 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 rejects) 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).

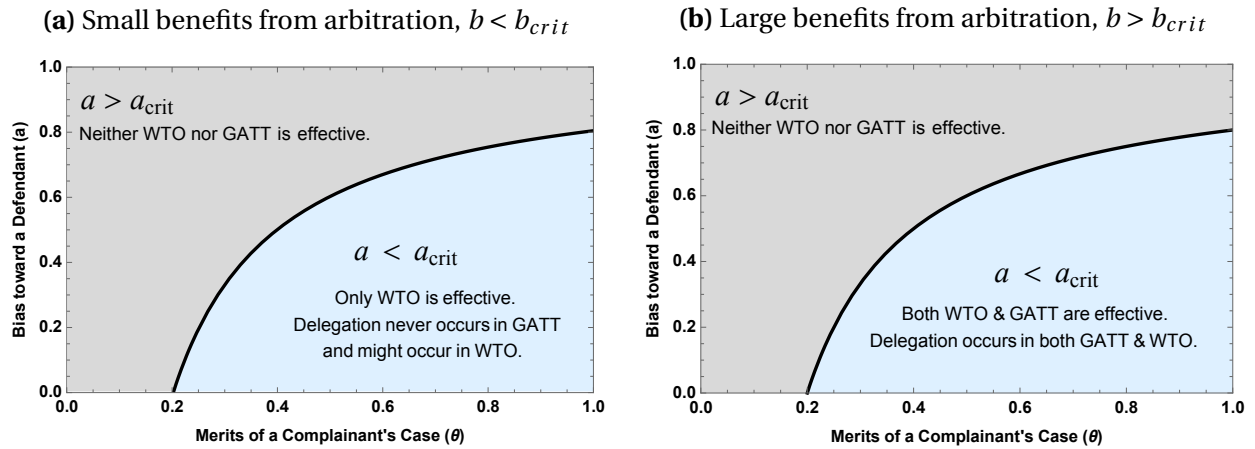
The same comparative statics as in case (ii) apply, because C 's expected payoff is the same either way. This raises an important point, in that when D makes an acceptable proposal (case (ii)), he just offers C her expected payoff for delegation, and hence her cost of litigation still factors into her 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.³⁶ 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 effective in

³⁶This 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 4: Settlements in equilibrium (GATT vs. WTO)

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.

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 4a and 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 4a and 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 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 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 $a < a_{crit}$.³⁷ 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 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 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 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

³⁷ 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 $a_{crit} \equiv 1 - \frac{C_C}{\theta}$.

costly delegation occurring, analogous to the informational explanation for costly war occurring.

5 Distributional Consequences of Legalization

The game theoretic bargaining model above demonstrates that weaker complainants are more likely to gain from WTO disputes relative to GATT disputes due to the complainants' increased bargaining leverage that the WTO DSM grants to them. In this section, I further investigate whether the gains from trade disputes under the WTO relative to the GATT differ across countries. In particular, I examine the conditional effect of the institutional changes in the GATT/WTO DSM on complainants' power. To uncover the relationship, I consider two important variations into consideration: (i) the extent to which power plays a role in dispute resolution, and (ii) the extent to which disputants value immediate rewards more than delayed ones. Note that the main findings hold when the model takes into account such variations in the relevant parameters.

To incorporate those features into the model, I first differentiate the level of institutional bias between the GATT and the WTO. Power disparity between disputing parties is captured by the level of bias in GATT/WTO adjudication, $a \in (0, 1)$, in the model. Previously, the model does not differentiate it for the sake of simplicity. Given that GATT is more power-based than WTO, however, GATT arbitration is more biased than WTO arbitration toward the more powerful party. This leads to $a_{GATT} > a_{WTO}$.

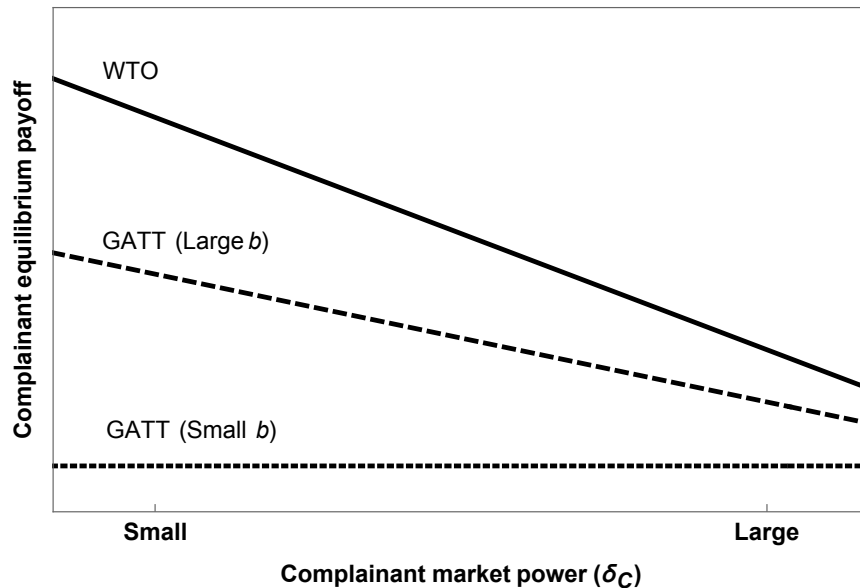
I also differentiate players complainants by their economic power such that larger economies are more patient than smaller economies in terms of future payoffs. For the sake of simplicity, the model uses a common discount factor, $\delta \in (0, 1)$, by which both players discount their future payoffs. Consider the nature of a discount factor. The lower the discount factor (e.g. 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 is to lift the alleged trade barriers and promote freer trade flows, richer and larger countries are more patient than poorer and smaller countries in terms of trade flows. As a result, richer and larger countries discount future payoffs less than poorer and smaller countries do. Put differently, the greater the complainant's market power the

higher her discount factor δ_C .

Now I suppose the complainant prefers litigation such that her chance of winning exceeds the cost of litigation (i.e., $(1 - a)\theta > C_C$). If $(1 - a)\theta > C_C$, 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.

In particular, with $b < b_{crit}$ (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 0³⁸. Thus, the complainant is strictly better in the WTO than the GATT. When $b > b_{crit}$ (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, $\frac{(1 - a_{WTO})\theta - C_C}{1 - \delta_C} > \frac{(1 - a_{GATT})\theta - C_C}{1 - \delta_C}$.

Figure 5: Theoretical relationship between dispute settlement systems and complainant's payoff (Complainant's probability of winning > Cost of litigation)



This relationship by the complainant's market power δ_C is shown in Figure 5. In disputes

³⁸If $(1 - a)\theta > C_C$, then $\frac{(1 - a)\theta - C_C}{1 - \delta_C} > 0$.

filed by poorer and smaller complainants, there is a significant relationship between their payoffs and the type of international arbitration. For disputes filed by rich and large complainants, however, their payoffs from WTO disputes do not appear significantly likely to be greater than their payoffs from GATT disputes. Put simply, if the WTO's legalized dispute settlement helps poorer and smaller complainants disproportionately, poorer and smaller complainants continue to promote trade of affected products after WTO disputes more than they could do after GATT disputes, while richer and larger complainants are unlikely to do so. This conditional effect leads to the following hypothesis.

Hypothesis 1. *All else equal, the poorer and smaller 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 and larger.*

If the condition, $(1 - a)\theta > C_C$, is not satisfied, the complainant would never choose litigation. As a result, international institutions fail to generate bargaining leverage for the weak complainant. For testing empirical expectations, I implicitly assume that such condition is met to draw a simple hypothesis above.

6 Empirics

I test the hypothesis above on an original data set of GATT and WTO disputes filed between 1989 and 2015. The 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 in the sample. To do so, I construct a new database containing trade flows for each GATT/WTO dispute over products filed between 1989 and 2015 (65 GATT disputes and WTO disputes from DS1 to DS498 with specific disputed products).³⁹

³⁹By focusing on trade flows for disputed products rather than services, the analysis does not include GATT/WTO 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).

According to Hypothesis 1, the WTO's legalized dispute settlement system helps smaller and poorer complainants disproportionately. Poor and small complainants are more likely than rich and large complainants to continue to promote trade of affected products after WTO disputes than they could do after GATT disputes. If we observe this conditional effect, the gains from trade and the trade organization are more evenly distributed among income groups under 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 its 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).

7 Variables

7.1 Dependent Variable

To test Hypothesis 1, 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.⁴⁰ 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.⁴¹

For each dispute, I identify the disputed products and examine trade flows of those products

⁴⁰For 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.

⁴¹Kucik and Pelc (2016) note that the heterogeneous impact of a dispute on trade flows across the products is highly suspect (874).

at various levels of Harmonized System Codes.⁴² 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).⁴³ Because the distribution is highly skewed, I take the natural 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, and for three years for robustness check) to avoid the impact of artificial changes in trade data as a result of missing values. This is consistent with the strategy of Kucik and Pelc (2016) which I largely follow the data construction in terms of import flows over the affected products in a given dispute. 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. For the five-year window, my sample consists of GATT disputes filed since 1989 and WTO disputes ranging from DS1 to DS449.⁴⁴ All the disputes the sample includes end no later than 2014 (e.g. DS437 and DS449) and consequently, the sample includes bilateral trade data until 2019. For the three-year window, the sample consists of GATT disputes filed since 1989 and WTO disputes ranging from DS1 to DS487. All the disputes the sample includes end no later than 2016 (e.g. DS477 and DS487), and the sample also includes bilateral trade data until 2019.

7.2 Independent Variables

The key independent variable is the presence of the WTO's dispute settlement mechanism. *WTO* is coded 1 for the WTO period, and 0 otherwise. Another key independent variable is the complainant's market power in terms of GDP (in constant 2010 USD, logged). Among

⁴²To my knowledge, no study of GATT/WTO dispute settlement has done this on GATT disputes rather than WTO disputes.

⁴³Data available at <https://comtrade.un.org/>. For a dispute involving the EU, I aggregate trade data 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.

⁴⁴The coverage of my sample is significant greater than the sample of Kucik and Pelc (2016) ranging from DS1 to DS396.

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. Hegre, 2008; Gartzke, 2007). Because the absolute size of the economy is highly correlated with markets and production capacities, which causes smaller and poorer countries not to be able to get what they want when filing disputes. As an alternative measure, in supplementary appendix, I use GDP per capita (in constant 2010 USD, logged), one of the most frequently used measures of power in both the international conflict and political economy literature (e.g. Bown, 2005).

7.3 Control Variables

I include several control variables to control for confounding factors. I first 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).⁴⁵

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.⁴⁶ 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*.

⁴⁵Polity5 data available from <http://www.systemicpeace.org/inscrdata.html>.

⁴⁶Note 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.

I further control for issues over which disputes often arise. The two most frequently disputed areas of the WTO law are Anti-dumping and Agriculture. *Anti-dumping* is coded 1 if the legal basis of the disputed policy is Anti-Dumping (AD), and 0 otherwise. Similarly, *Agriculture* is coded 1 if the disputed policy is agricultural, and 0 otherwise. In robustness check, I also control for whether the issue area is the third most frequent issue area, Subsidy and Countervailing Duties (CVD). *Subsidy and countervailing duties* is coded 1 if the legal basis of the disputed policy is subsidy and CVD, and 0 otherwise. In addition to that, I control for whether the dispute is bilateral or multilateral in terms of its participants. *Multilateral* is coded 1 for the dispute has more than one complainant or respondent, and 0 otherwise. Summary statistics for all variables and a correlation matrix are included in supplementary appendix.

8 Results

I run a series of random-effects models due to the absence of temporal variation in the main explanatory variable *WTO*.⁴⁷ I cluster the standard errors at the dispute level. I present the main results in Table 1. All models include dispute-level random effects to vary baseline levels of trade flows of the affected products across disputes. Recall that my game theoretic bargaining model assumes that powerful states are willing to wield their power to get away with violating agreements. A defendant is more powerful than a complainant in the model to test the role of the more legalized WTO-DSM in helping less powerful complainant. Models 1-3 in Table 1 represent those disputes. Table 1 also includes other samples such as disputes with more powerful complainants (Model 5) and all disputes regardless of disputing parties' relative power (Model 4).

Model 1 of Table 1 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 greater market power, than complainants with less market power, are expected to gain more from

⁴⁷See 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.

Table 1: Regression models of post-dispute trade flows over five years

	Post-dispute imports of disputed products				
	Model 1	Model 2	Model 3	Model 4	Model 5
WTO	0.429 (0.604)	23.741*** (3.228)		22.400*** (3.224)	-26.987*** (9.266)
Complainant GDP (log)	0.411*** (0.120)	1.017*** (0.136)	1.176*** (0.288)	0.931*** (0.120)	-1.291*** (0.358)
WTO × Complainant GDP (log)		-0.855*** (0.133)	-1.160*** (0.105)	-0.767*** (0.119)	0.920*** (0.319)
Complainant income PC (log)	-0.221 (0.262)	-0.335 (0.262)	-0.929 (0.778)	-0.512** (0.238)	0.245 (0.360)
Prior imports (log)	0.588*** (0.073)	0.583*** (0.065)	0.445*** (0.068)	0.621*** (0.061)	0.784*** (0.071)
Total imports (log)	-0.184 (0.142)	-0.041 (0.148)	0.122 (0.384)	0.088 (0.106)	0.413*** (0.086)
Complainant polity	-0.022 (0.028)	-0.005 (0.028)	0.082 (0.074)	0.016 (0.024)	-0.015 (0.125)
Defendant GDP (log)	0.347* (0.193)	0.335* (0.186)	4.294 (2.658)	0.321*** (0.090)	0.020 (0.100)
Defendant income PC (log)	0.186 (0.346)	0.193 (0.369)	-3.185 (3.622)	-0.097*** (0.028)	-0.081*** (0.015)
Defendant polity	0.018 (0.039)	0.002 (0.041)	0.041 (0.032)	0.018 (0.028)	0.024 (0.029)
Multilateral	-0.145 (0.604)	0.254 (0.790)		0.162 (0.621)	-0.249 (0.441)
Agriculture	-0.055 (0.312)	0.259 (0.353)		0.393* (0.229)	0.355* (0.213)
Anti-dumping	-0.145 (0.314)	-0.154 (0.335)		-0.662** (0.268)	-1.162** (0.512)
Intercept	-13.781*** (5.281)	-31.274*** (5.523)	-87.689* (48.142)	-27.519*** (4.225)	31.337*** (9.746)
Observations	750	750	750	1344	594
R^2	0.68	0.61	0.38	0.67	0.82
Dispute Fixed Effects	No	No	Yes	No	No
Complainant Power	Weaker	Weaker	Weaker	All Sample	Stronger

Note: Cluster robust standard errors in parentheses. In Models 1-3, the complainant is weaker than the defendant. Model 4 looks at all disputes. Model 5 looks at disputes where the complainant is weaker than the defendant. *WTO* constituent term as well as *Multilateral*, *Agriculture*, *AD* omitted in Model 3 because they only vary by dispute and the specification includes fixed dispute effects. The dependent variable is the complainant's exports of the affected products to the defendant over five years after a dispute ends. The level of analysis is the dispute - country pair - year level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

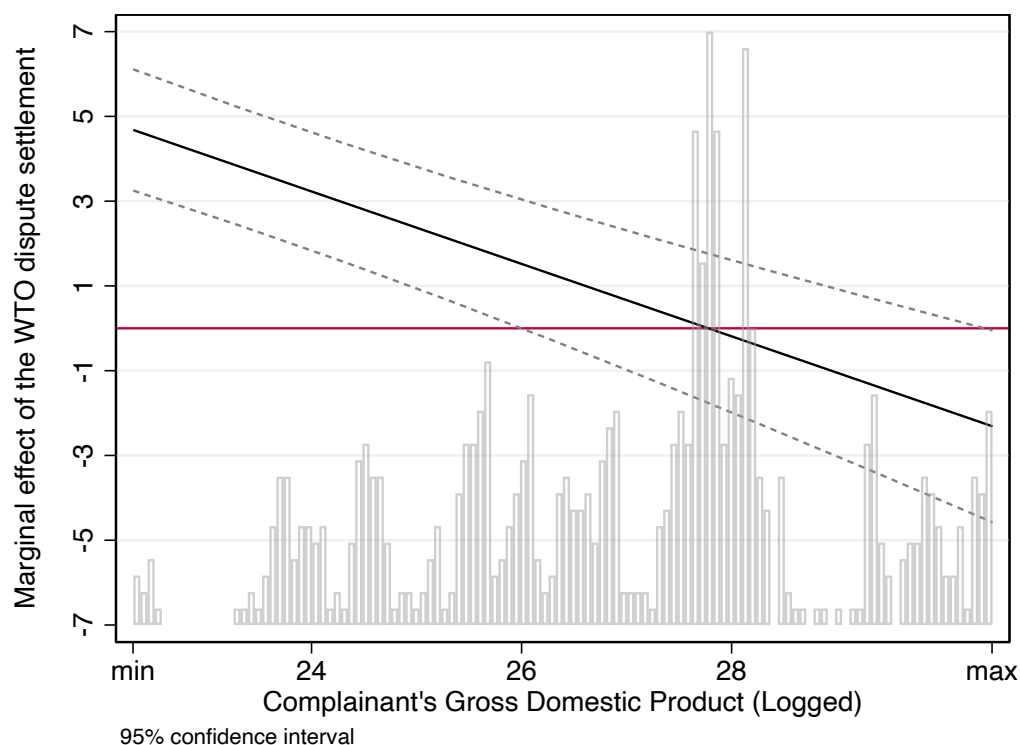
a dispute against their more powerful counterparts. Similarly, the coefficient on the defendant's GDP is positive and statistically significant, suggesting that larger economies are more likely to get what they want than smaller economies. The coefficients on the complainant's per capita income of both the complainant and the defendant are 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 either, suggesting that having domestic audiences or not is unlikely to increase or decrease post-dispute trade flows of the affected products.⁴⁸

The results also present the impact of trade relationship between disputing parties on their post-dispute trade flows. First, the coefficient on *Prior imports* is positive and statistically significant, which indicate that post-dispute trade flows of the disputed products will increase with the strength of the bilateral trade relationship over those 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 between disputing parties.

To test whether the impact of the WTO DSM on the complainant's payoff varies by the complainant's 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 6. I also include a histogram of the conditional variable *Complainant's GDP (logged)*.

Figure 6 shows that the effect of the WTO DSM is positive at low levels of the complainant's GDP. Smaller and poorer complainants are more likely to export the affected products to the defendant after a WTO dispute relative to a GATT dispute. For example, for Nicaragua (1994) and Honduras (2005), their post-dispute trade gains from a WTO dispute are greater than those gains from a GATT dispute, while India (2009) and China (2014) are unlikely to experience such difference in trade gains between WTO and GATT disputes (Figure 7). About 31% of the sample

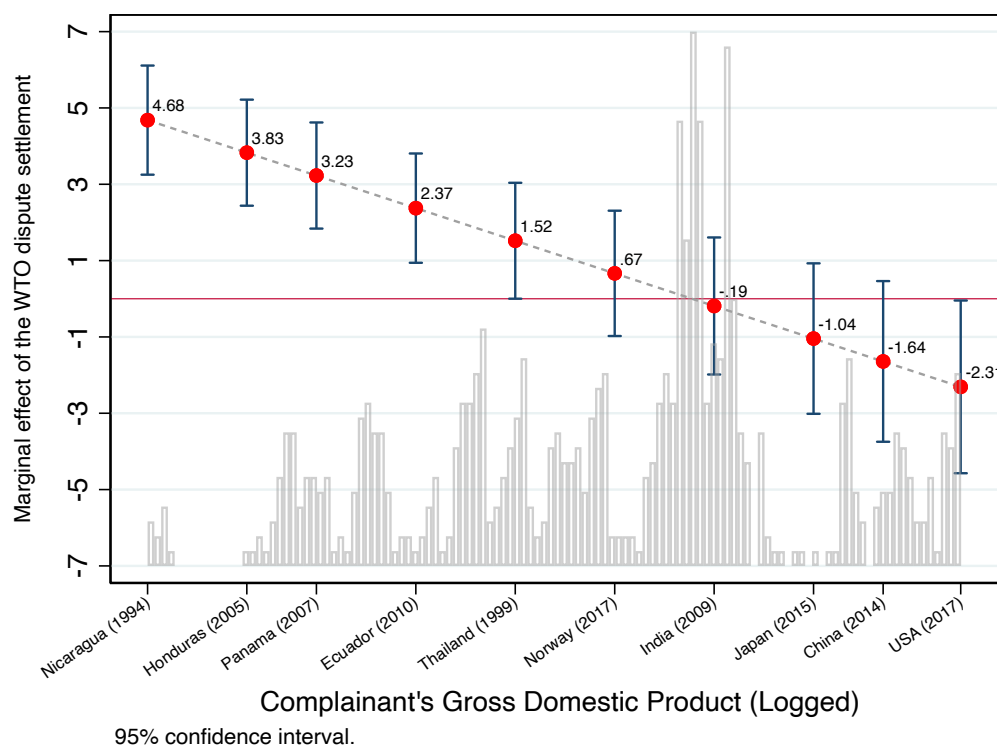
⁴⁸The findings hold when I use an alternative democracy measure, *Democratic pair* being coded 1 if both parties are democracies, following Kucik and Pelc (2016).

Figure 6: Marginal effect of the WTO by the complainant's GDP (Model 2, Table 1)

falls in the category of poor and small complainants like Nicaragua and Honduras (i.e. the log of GDP below 26.01) at the 0.05 level.⁴⁹ The significant portion of the range highlights that the highly legalized dispute resolution system that the WTO offers benefits poor and small countries.

The impact of the WTO DSM on the complainant's post-dispute exports is increasingly negative as a function of its GDP. At the highest levels of the complainant's GDP, a switch of dispute settlement mechanism from the GATT to the WTO leads to a decrease in the complainant's export flows to the defendant's market. Figure 7 shows that the gains in trade flows from a WTO dispute are smaller than the expected gains from a GATT dispute for the richest complainant country, USA (2017). About 2% of the sample falls in the category of very rich and large complainants (i.e. the log of GDP above 30.4) at the 0.05 level. At the 0.1 level, about 8% of the sample falls in that category (i.e. the log of GDP above 29.88). Taken together, the results show that the WTO

⁴⁹At the 0.1 level, about 34% of the sample (i.e. the log of GDP below 26.27) falls in that category.

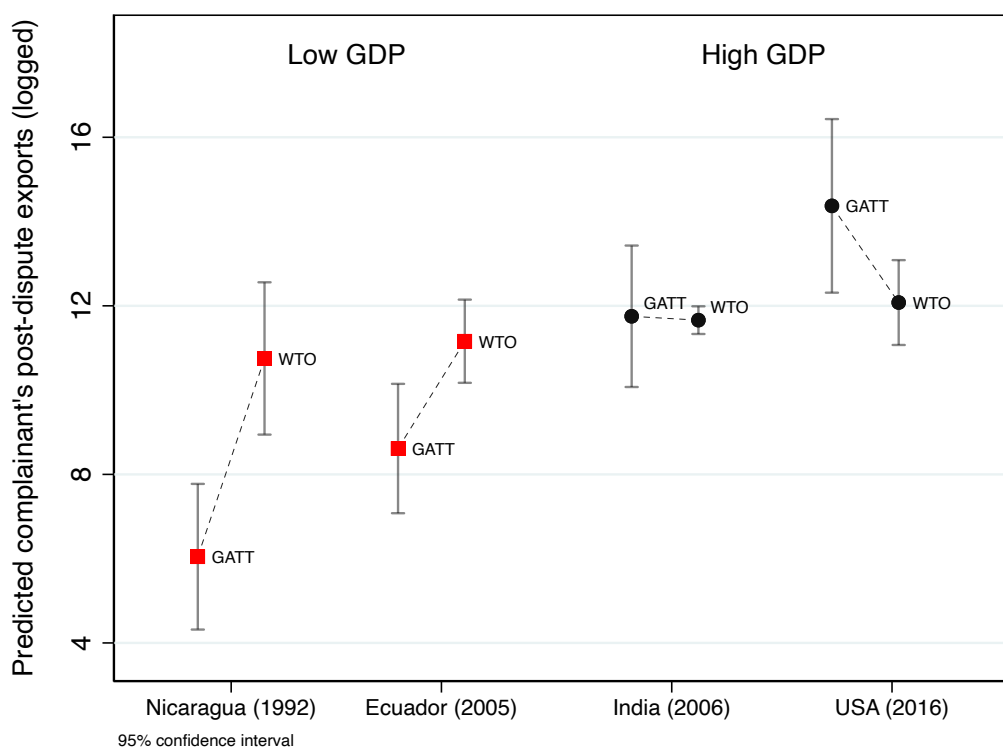
Figure 7: Marginal effect of the WTO by the complainant's GDP (Model 2, Table 1)

provides a more level playing field to poor and small countries relative to the GATT, not only by increasing the gains of dispute settlement for smaller and poorer complainants but also by decreasing the gains for the richest and largest 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 8.

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 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 supplementary appendix. The patterns are similar to those found in the sample of disputes with weaker complainants, except about 48% of the full sample falls in the category of the complainant's market power (i.e. the log of GDP below 28.09) at the 0.05 level where the WTO increases post-dispute trade gains for a complainant country.

Figure 8: Gains from trade disputes at the GATT vs. the WTO (Model 2, Table 1)



Substantively, the size of the effect is significant. Based on the results in Model 2, I plot the predicted volume of the complainant's post-dispute exports across four exemplary countries. Figure 8 shows the predicted effect of the WTO on the complainant's post-dispute exports of the affected products to the defendant. 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. The model predicts that when the complainant's GDP is 4,710 million constant 2010 USD, its post-dispute exports to the defendant

are 6.045 (95% CI: 4.317, 7.774) in logged dollars for GATT disputes, as opposed to 10.751 (95% CI: 8.943, 12.558) for WTO disputes. This amounts to a difference of \$46.25 million. This is an increase of 111 times from \$0.422 to \$46.667 million.

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 58,880 million constant (2010) USD. The model predicts that the complainant's GDP is 58,880 million USD, the post-dispute exports are 8.613 (95% CI: 7.079, 10.148) in logged dollars for GATT disputes, as opposed to 11.160 (95% CI: 10.173, 12.147) for WTO disputes. This amounts to a difference of \$64.8 million. This is an increase of 12.8 times from \$5.5 to \$70.26 million.

India's GDP was 1,290 billion constant (2010) USD when India filed a case against the United States over the frozen warmwater shrimp in 2006. The model predicts that for those complainant countries whose GDP is 1,290 billion USD, the post-dispute exports are 11.752 (95% CI: 10.073, 13.430) in logged dollars for GATT disputes, as opposed to 11.660 (95% CI: 11.332, 11.989) for WTO disputes. This amounts to a difference of \$11.1 million. This is a decrease of 8.74 per cent in annual exports from \$126.96 to \$115.86 million. However, this slight decrease is not statistically significant as the 95% CI for the difference contains zero.

The model also predicts that for those large and rich countries whose GDP is 16,970 billion USD, the post-dispute exports are 14.371 (95% CI: 12.312, 16.431) in logged dollars for GATT disputes, as opposed to 12.078 (95% CI: 11.071, 13.085) for WTO disputes. This amounts to a difference of \$1.567 billion. This is a decrease of 89.9 per cent in annual exports from \$1.743 to \$ 0.176 billion. It is worth to note that the United States is the largest economy since 2002 in the sample. Thus, the predicted post-dispute trade flows above are based on a hypothetical scenario where US has a dispute against its more powerful counterpart (which does not exist in the sample). At the 0.1 level, the effect of the WTO DSM becomes negative at the high levels of the complainant's GDP, i.e. top 8% (the log of GDP above 29.88 or 9,478 billion USD). This leads to a case filed by the US against the EU over the agricultural products and foodstuffs in

1999. US' GDP was 12,120 billion constant (2010) USD which is smaller than EU's GDP of 12,210 billion USD. The model predicts that US' post-dispute exports to EU are 14.029 (90% CI: 12.350, 15.708) in logged dollars for GATT disputes, as opposed to 12.023 (95% CI: 11.267, 12.779) for WTO disputes. This amounts to a difference of \$1,071 billion. This is a decrease of 86.55 per cent in annual exports from \$1.238 to \$0.167 billion.

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 asymmetric countries. The highly legalized dispute resolution system helps level the playing field for poor and less powerful member countries in the multilateral trading system.

9 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 GATT to the WTO. 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. Using both game theoretic models and empirical analysis, this paper examines the impact of legalization of the multilateral trading system on state behavior and distributional consequences of international trade. I argue that the more legalized institutional features of the WTO empower complainant countries. Due to the increased bargaining leverage the WTO grants to complainants, concessions are more likely to occur under the WTO than the GATT. I further argue that the WTO is more likely to benefit poor and small complainants than rich and large complainants. The distributional consequences of the complainant bias are conditional on the level of complainant market power.

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. The model demonstrates that under the GATT bargaining, the

weak complainant has bargaining leverage when (1) her powerful 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.

By contrast, under the WTO bargaining, the weak complainant fares well relative to private bargaining regardless of occurrence of litigation. For the WTO's dispute settlement mechanism to benefit the weaker complainant, the one following condition should be met: the complainant's winning the case in litigation is greater than her cost of litigation. These results suggest 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, relative to the GATT. The sheer existence of international arbitrators alone fails to function as an effective means of threat; however, legalization can offer a voice to less powerful states, thereby improving the distribution of power and gains from international trade.

Based on the theoretical relationships drawn from the bargaining model, I also 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 and small states disproportionately. Specifically, the WTO increases the complainant's trade gains from dispute settlement relative to the GATT for smaller and poorer complainants but not for rich and large complainants. I test the argument using an original data set on post-dispute trade flows for each GATT/WTO dispute filed between 1989 and 2015. Empirical evidence strongly supports the argument. These results indicate that the highly legalized dispute settlement mechanism of the WTO provides significant *de facto* trade gains for poor and small complainants.

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 dispute settlement crisis in the WTO 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.

The findings of this paper 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.

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Legalization of International Institutions and Its Discontents: GATT vs. WTO Adjudication, 1989-2015

Online appendix

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January, 2021

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1 Proof of propositions

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 $\frac{(1-(1-a)\theta)(1+b)-C_D}{1-\delta}$ ($< \frac{1}{1-\delta}$ 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 $\frac{(1-(1-a)\theta)(1+b)-C_D}{1-\delta}$ ($\geq \frac{1}{1-\delta}$ 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 $\frac{[1-(1-a)\theta](1+b)-C_D}{1-\delta}$ ($\geq \frac{1}{1-\delta}$ 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 $1 + \frac{\delta([1-(1-a)\theta](1+b)-C_D)}{1-\delta}$, 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 $\frac{\delta[(1-a)\theta - C_C]}{1-\delta}$, 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., $\frac{\delta[(1-a)\theta - C_C]}{1-\delta}$ in current terms). C cannot make an acceptable offer that will get her more than $\frac{\delta[(1-a)\theta - C_C]}{1-\delta}$ because $b > b_{crit'}$. D also has no profitable deviation. If he rejects, he will get 1 the current failed period and $\frac{[1-(1-a)\theta](1+b) - C_D}{1-\delta}$ from delegation in the next period, i.e., $\frac{1-\delta[(1-a)\theta(1+b) + C_D - b]}{1-\delta}$ in current terms. If D accepts $x_C > \delta[(1-a)\theta(1+b) + C_D - b]$, he gets strictly less than $\frac{1-\delta[(1-a)\theta(1+b) + C_D - b]}{1-\delta}$. 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 $\frac{\delta^2[(1-a)\theta-C_C]}{1-\delta}$ 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. ■

2 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.

Data sources

- *Prior-, Post-dispute, and Total imports*. Data on trade flows comes from the UN Commodity Trade Statistics Database (UN Comtrade). Available at <https://comtrade.un.org/>.
- *WTO and Multilateral* computed from the GATT/WTO arbitration documents. Available at https://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm.
- *Anti-dumping, Agriculture, Subsidy and countervailing duties* are based on the descriptive text of the characterization of disputed issue over which disputes often arise specified by the GATT/WTO arbitration documents. Available at https://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm.
- Polity IV data available from <https://www.systemicpeace.org/inscrdata.html>
- Controls (GDP per capita, income per capita, population):
<http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators>

Table 1: Summary Statistics (weaker-complainant sample)

Variable	Mean	Std. Dev.	Min.	Max.	N
Post-dispute imports of disputed products (log)	11.34	3.1	-1.1	17.74	755
WTO	0.59	0.49	0	1	5532
Prior imports of disputed products (log)	10.96	3.31	1.57	17.73	1586
Imports of all products (log)	16.38	2.51	0.82	20.01	4938
Complainant GDP (log)	27.17	1.82	20.68	30.51	5397
Complainant income PC (log)	9.52	0.94	0	11.23	5314
Complainant GDPPC (log)	9.42	1.23	6.01	11.43	5397
Complainant population (log)	17.75	1.55	11.27	21.05	5397
Complainant polity	7.88	3.84	-10	10	5389
Complainant polcon	0.66	0.24	0	0.87	5079
Defendant GDP (log)	29.72	1.14	24.31	30.51	5397
Defendant income PC (log)	10.23	0.51	7.84	10.8	5397
Defendant GDPPC (log)	10.32	0.6	6.57	10.95	5397
Defendant population (log)	19.4	0.86	15.98	21.05	5397
Defendant polity	9.31	2.51	-10	10	5396
Defendant polcon	0.77	0.14	0	0.87	5085
Democratic dyad	0.88	0.33	0	1	5388
Multilateral	0.19	0.39	0	1	5532
Agriculture	0.31	0.46	0	1	5532
Anti-dumping (AD)	0.18	0.38	0	1	5532
Subsidy and countervailing duties (CVD)	0.18	0.38	0	1	5532

Table 2: Summary Statistics (full sample)

Variable	Mean	Std. Dev.	Min.	Max.	N
Post-dispute imports of disputed products (log)	11.47	3	-1.1	17.74	1350
WTO	0.67	0.47	0	1	10272
Prior imports of disputed products (log)	11.22	3.13	1.57	17.73	2646
Imports of all products (log)	16.44	2.41	-0.76	20.01	9173
Complainant GDP (log)	28.21	2.01	20.68	30.51	9857
Complainant income PC (log)	9.80	0.88	0	11.23	9772
Complainant GDPPC (log)	9.77	1.11	6.01	11.43	9857
Complainant population (log)	18.44	1.54	11.27	21.05	9860
Complainant polity	8.56	3.18	-10	10	9912
Complainant polcon	0.71	0.2	0	0.87	9274
Defendant GDP (log)	28.8	1.73	22.56	30.51	9964
Defendant income PC (log)	9.95	0.82	0	11.23	9923
Defendant GDPPC (log)	9.98	0.97	6.21	11.42	9964
Defendant population (log)	18.82	1.41	14.05	21.05	9968
Defendant polity	8.64	3.49	-10	10	9967
Defendant polcon	0.73	0.19	0	0.89	9315
Democratic dyad	0.88	0.32	0	1	9911
Multilateral	0.14	0.34	0	1	10272
Agriculture	0.27	0.45	0	1	10272
Anti-dumping (AD)	0.17	0.37	0	1	10272
Subsidy and countervailing duties (CVD)	0.2	0.4	0	1	10272

Table 3: Correlation Matrix (weaker-complainant sample)

Variables	0	1	2	3	4	5	6	7	8	9	10	11	12
0. Post-dispute imports (log)	1.00												
1. WTO	0.10 (0.01)	1.00											
2. Complainant GDP (log)	0.34 (0.00)	0.03 (0.02)	1.00										
3. Complainant income PC (log)	0.18 (0.00)	-0.19 (0.00)	0.53 (0.00)	1.00									
4. Complainant polity	-0.16 (0.00)	-0.11 (0.00)	0.16 (0.00)	0.42 (0.00)	1.00								
5. Defendant GDP (log)	0.36 (0.00)	-0.06 (0.00)	0.39 (0.00)	0.20 (0.00)	0.01 (0.50)	1.00							
6. Defendant income PC (log)	0.36 (0.00)	-0.03 (0.04)	0.28 (0.00)	0.15 (0.00)	-0.03 (0.01)	0.68 (0.00)	1.00						
7. Defendant polity	0.13 (0.00)	-0.21 (0.00)	0.05 (0.00)	0.04 (0.00)	0.09 (0.00)	0.27 (0.00)	0.54 (0.00)	1.00					
8. Prior imports (log)	0.83 (0.00)	0.09 (0.00)	0.16 (0.00)	0.11 (0.00)	-0.14 (0.00)	0.26 (0.00)	0.31 (0.00)	0.08 (0.00)	1.00				
9. Total imports (log)	0.45 (0.00)	0.05 (0.00)	0.82 (0.00)	0.49 (0.00)	0.06 (0.00)	0.63 (0.00)	0.51 (0.00)	0.18 (0.00)	0.33 (0.00)	1.00			
10. Multilateral	-0.22 (0.00)	-0.14 (0.00)	-0.24 (0.00)	-0.24 (0.00)	-0.05 (0.00)	0.10 (0.00)	0.02 (0.11)	0.12 (0.00)	-0.33 (0.00)	-0.17 (0.00)	1.00		
11. Agriculture	-0.20 (0.00)	-0.31 (0.00)	-0.09 (0.00)	0.04 (0.00)	0.10 (0.00)	0.05 (0.00)	-0.10 (0.00)	0.03 (0.01)	-0.29 (0.00)	-0.09 (0.00)	0.23 (0.00)	1.00	
12. Anti-dumping	0.14 (0.00)	0.24 (0.00)	0.15 (0.00)	-0.07 (0.00)	-0.16 (0.00)	0.11 (0.00)	0.16 (0.00)	-0.02 (0.22)	0.19 (0.00)	0.23 (0.00)	-0.12 (0.00)	-0.28 (0.00)	1.00

Table 4: Correlation Matrix (full sample)

Variables	0	1	2	3	4	5	6	7	8	9	10	11	12
0. Post-dispute imports (log)	1.00												
1. WTO	0.11 (0.00)	1.00											
2. Complainant GDP (log)	0.29 (0.00)	0.07 (0.00)	1.00										
3. Complainant income PC (log)	0.18 (0.00)	-0.07 (0.00)	0.65 (0.00)	1.00									
4. Complainant polity	-0.08 (0.00)	-0.07 (0.00)	0.29 (0.00)	0.46 (0.00)	1.00								
5. Defendant GDP (log)	0.35 (0.00)	-0.19 (0.00)	-0.01 (0.51)	0.01 (0.26)	-0.07 (0.00)	1.00							
6. Defendant income PC (log)	0.17 (0.00)	-0.24 (0.00)	-0.03 (0.01)	0.01 (0.46)	-0.06 (0.00)	0.60 (0.00)	1.00						
7. Defendant polity	0.04 (0.12)	-0.23 (0.00)	-0.12 (0.00)	-0.08 (0.00)	0.03 (0.00)	0.17 (0.00)	0.50 (0.00)	1.00					
8. Prior imports (log)	0.86 (0.00)	0.10 (0.00)	0.22 (0.00)	0.16 (0.00)	-0.06 (0.00)	0.26 (0.00)	0.16 (0.00)	-0.01 (0.63)	1.00				
9. Total imports (log)	0.49 (0.00)	-0.03 (0.01)	0.68 (0.00)	0.49 (0.00)	0.13 (0.00)	0.58 (0.00)	0.38 (0.00)	0.05 (0.00)	0.42 (0.00)	1.00			
10. Multilateral	-0.13 (0.00)	-0.17 (0.00)	-0.21 (0.00)	-0.19 (0.00)	-0.09 (0.00)	0.14 (0.00)	0.16 (0.00)	0.14 (0.00)	-0.22 (0.00)	-0.12 (0.00)	1.00		
11. Agriculture	-0.15 (0.00)	-0.33 (0.00)	-0.06 (0.00)	0.04 (0.00)	0.07 (0.00)	0.06 (0.00)	-0.01 (0.48)	0.08 (0.00)	-0.24 (0.00)	-0.04 (0.00)	0.16 (0.00)	1.00	
12. Anti-dumping	0.02 (0.48)	0.18 (0.00)	-0.01 (0.35)	-0.13 (0.00)	-0.15 (0.00)	0.01 (0.24)	-0.01 (0.17)	-0.05 (0.00)	0.10 (0.00)	0.09 (0.00)	-0.10 (0.00)	-0.23 (0.00)	1.00

3 Robustness checks

Figure 1: Marginal effect of WTO by the complainant's GDP, Full sample (Model 4, Table 1)

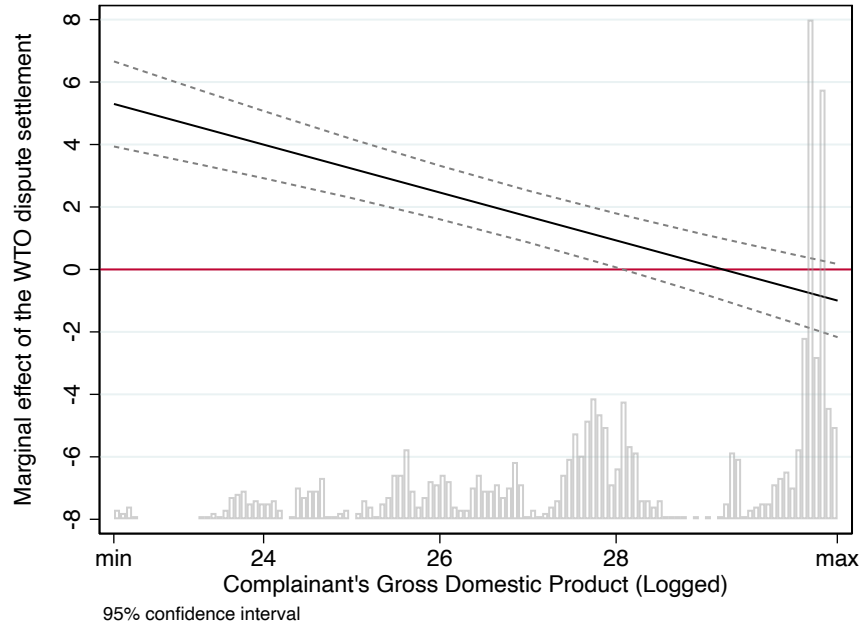


Figure 2: Marginal effect of WTO by complainant GDP, stronger-complainant sample (Model 5, Table1)

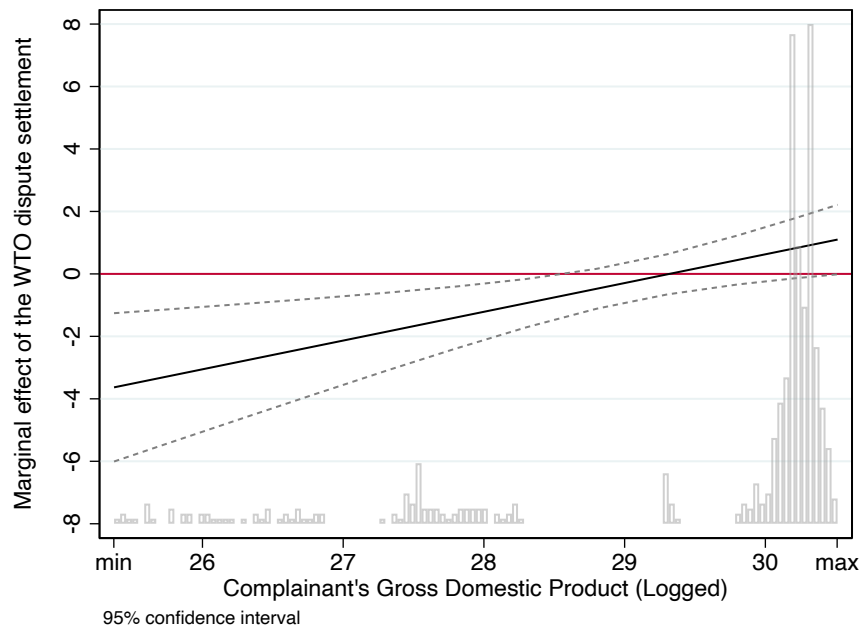


Table 5: Regression models of post-dispute trade flows over three years

	Post-dispute imports of disputed products				
	Model 1	Model 2	Model 3	Model 4	Model 5
WTO	0.384 (0.592)	20.128*** (4.893)		19.027*** (4.424)	-23.285*** (6.090)
Complainant GDP (log)	0.361*** (0.118)	0.924*** (0.164)	1.281*** (0.300)	0.808*** (0.149)	-0.906*** (0.266)
WTO × Complainant GDP (log)		-0.725*** (0.196)	-1.228*** (0.125)	-0.655*** (0.161)	0.786*** (0.211)
Complainant income PC (log)	-0.065 (0.192)	-0.159 (0.190)	-0.987 (0.856)	-0.295* (0.175)	0.176 (0.418)
Prior imports (log)	0.663*** (0.067)	0.662*** (0.059)	0.477*** (0.067)	0.707*** (0.058)	0.926*** (0.064)
Total imports (log)	-0.117 (0.118)	-0.040 (0.117)	0.148 (0.438)	0.069 (0.084)	0.214** (0.089)
Complainant polity	-0.037 (0.027)	-0.029 (0.025)	0.054 (0.090)	-0.017 (0.024)	-0.089 (0.165)
Defendant GDP (log)	0.141 (0.161)	0.141 (0.160)	1.995 (2.508)	0.236*** (0.084)	-0.039 (0.111)
Defendant income PC (log)	0.224 (0.288)	0.267 (0.301)	2.211 (4.408)	-0.085** (0.036)	-0.070*** (0.020)
Defendant polity	0.039 (0.038)	0.019 (0.039)	0.064 (0.079)	0.025 (0.023)	0.008 (0.023)
Multilateral	0.007 (0.546)	0.368 (0.748)		0.295 (0.557)	-0.075 (0.273)
Agriculture	0.110 (0.302)	0.359 (0.351)		0.499** (0.213)	0.546*** (0.192)
Anti-dumping	-0.250 (0.269)	-0.271 (0.282)		-0.556** (0.235)	-0.952** (0.477)
Intercept	-10.196** (4.614)	-26.261*** (6.081)	-75.628* (42.411)	-24.230*** (5.192)	24.791*** (7.006)
Observations	476	476	476	856	380
R^2	0.71	0.67	0.41	0.72	0.84
Dispute Fixed Effects	No	No	Yes	No	No
Complainant Power	Weaker	Weaker	Weaker	All Sample	Stronger

Note: Cluster robust standard errors in parentheses. In Models 1-3, the complainant is weaker than the defendant. Model 4 looks at all disputes. Model 5 looks at disputes where the complainant is weaker than the defendant. *WTO* constituent term as well as *Multilateral*, *Agriculture*, *AD* omitted in Model 3 because they only vary by dispute and the specification includes fixed dispute effects. The dependent variable is the complainant's exports of the affected products to the defendant over three years after a dispute ends. The level of analysis is the dispute - country pair - year level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Regression models of post-dispute trade flows over five years

	Post-dispute imports of disputed products				
	Model 1	Model 2	Model 3	Model 4	Model 5
WTO	23.767*** (3.261)	22.655*** (3.012)	23.570*** (3.270)	13.382*** (3.924)	
Complainant GDP (log)	1.012*** (0.136)	0.985*** (0.134)	1.034*** (0.143)		
WTO × Complainant GDP (log)	-0.856*** (0.134)	-0.816*** (0.125)	-0.851*** (0.135)		
WTO × Complainant GDPPC (log)				-1.423*** (0.445)	-2.173*** (0.308)
Complainant income PC (log)	-0.324 (0.263)	-0.277 (0.249)	-0.297 (0.244)		
Complainant GDPPC (log)				1.634*** (0.456)	1.955*** (0.441)
Complainant population (log)				0.327*** (0.123)	0.394* (0.205)
Prior imports (log)	0.579*** (0.065)	0.581*** (0.066)	0.583*** (0.065)	0.562*** (0.060)	0.411*** (0.067)
Total imports (log)	-0.046 (0.149)	-0.019 (0.143)	-0.074 (0.150)	-0.278* (0.153)	-0.372 (0.392)
Complainant polity	-0.005 (0.028)			-0.048 (0.033)	-0.013 (0.066)
Complainant polcon		-0.186 (0.410)			
Democratic dyad			-0.444 (0.454)		
Defendant GDP (log)	0.330* (0.185)	0.298 (0.183)	0.314* (0.182)		
Defendant income PC (log)	0.181 (0.367)	0.216 (0.362)	0.309 (0.352)		
Defendant GDPPC (log)				0.636*** (0.243)	2.582 (1.694)
Defendant polity	0.008 (0.038)			0.016 (0.036)	0.055 (0.034)
Defendant polcon		-0.000 (1.018)			
Defendant population (log)				0.477** (0.202)	1.471 (5.257)
Multilateral	0.328 (0.800)	0.251 (0.785)	0.262 (0.790)	0.136 (0.785)	
Agriculture	0.220 (0.354)	0.244 (0.346)	0.262 (0.350)	-0.139 (0.366)	
Anti-dumping	-0.118 (0.338)	-0.177 (0.326)	-0.170 (0.337)	-0.098 (0.341)	
Subsidy and countervailing duties	0.357 (0.297)				
Intercept	-30.986*** (5.494)	-30.322*** (5.314)	-31.697*** (5.478)	-26.958*** (6.354)	-50.345 (92.221)
Observations	750	713	750	750	750
R ²	0.61	0.61	0.61	0.63	0.40
Dispute Fixed Effects	No	No	No	No	Yes
Complainant Power	Weaker	Weaker	Weaker	Weaker	Weaker

Note: Cluster robust standard errors in parentheses. In Models 1-5, the complainant is weaker than the defendant. *WTO* constituent term as well as *Multilateral*, *Agriculture*, *AD*, *Subsidy* and *CVD* omitted in Model 5 because they only vary by dispute and the specification includes fixed dispute effects. The dependent variable is the complainant's exports of the affected products to the defendant over five years after a dispute ends. The level of analysis is the dispute - country pair - year level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.