Audiences Features and the Strategic Timing of Trade Disputes

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1 Introduction

International institutions often lack independent enforcement capabilities. As a result, a large and growing body of literature argues that domestic actors play a crucial role in imposing costs on governments who defect from their agreements. International institutions, and dispute settlement mechanisms in particular, help facilitate international cooperation, because these bodies provide a forum to sound the alarm over violations of an agreement. Hearing this alarm, domestic audiences impose noncompliance costs on governments who do not abide by their international obligations. This threat of *ex post* punishment helps facilitate cooperation, *ex ante*. This dynamic is at the core of many broader theories of noncompliance costs, such as those based on the informational role of institutions,[1] credible commitments[2] or audience costs,[3] and has been applied to a variety of issue areas, from international trade agreements[4] to bilateral investment treaties[5] to human rights[6] to war crimes[7].

Yet, if institutional alarms trigger noncompliance costs, why is there significant variation in whether and when the alarm sounds? The World Trade Organization's (WTO) Dispute Settlement Understanding (DSU) is among the world's most active international courts, having heard over 420 cases. Yet, few would doubt that hundreds, if not thousands, of explicit tariff barriers and hidden non-tariff barriers have escaped DSU scrutiny. Additionally, WTO members often wait months or years before challenging objectionable trade practices. If the victim need only sound the alarm in order to mobilize domestic audiences against their government's policies, then why wait to initiate a dispute and forgo significant amounts of trade cooperation by delaying the alarm?

Existing theories lack leverage on these questions because they often assume the presence of

[1] Mansfield, Milner and Rosendorff (2000, 2002); Rosendorff (2005); Carrubba (2005); Carrubba, Gabel and Hankla (2008); Rosendorff (2005)

[2] Simmons (2000); Simmons and Danner (2010).

[3] Tomz (2007).

[4] Mansfield, Milner and Rosendorff (2000); Buthe and Milner (2008).

[5] Elkins, Guzman and Simmons (2006).

[6] Simmons (2009).

[7] Simmons and Danner (2010).

strong, cooperation-supporting audiences who imposes noncompliance costs when they hear an institutional alarm. Yet audiences vary in their preferences and strength, which undoubtedly affects their reaction to institutional alarms. Regarding preferences, audiences can vary in the intensity of their dislike of defections, and they frequently support, rather than oppose, non-compliant government policies. Audiences also vary in their strength, i.e. their ability to influence policymakers' political calculi. Government sensitivity varies over time, e.g. according to electoral cycles.

This paper advances our understanding of these questions theoretically and empirically. First, I provide a theory of institutions as information-providers showing (a) the conditions under which the dynamics entailed in often-referenced theories of noncompliance costs arise endogenously and (b) how variation in audience features affects the ability of international institutions to generate noncompliance costs. The theory generates a conditional hypothesis regarding audience features and dispute decisions. Sounding the alarm with a dispute is most valuable to the plaintiff country when domestic audiences in the defendant country are most "favorable," i.e. the audience prefers similar changes to the defendant government's policies as the plaintiff desires *and* when the defendant government cares about those audiences. When those audiences are less supportive of compliance, disputes are less valuable to the plaintiff or potentially harmful, so plaintiffs delay sounding the alarm.

Using competing risks analysis of the timing of trade disputes against the United States, I find strong support for this prediction. From the perspective of a potential plaintiff, sounding the alarm is least valuable during politically sensitive times in which there is wider support for protectionist measures. I use election years as a proxy for political sensitivity and unemployment, which is a key macroeconomic indicator associated with support for protectionism, as a proxy for audience preferences. U.S. trading partners are more likely to initiate WTO disputes against the U.S. during election years with lower unemployment and are less likely during election years with higher unemployment.

Apart from explaining important empirical variation, a theory in which noncompliance costs

are *derived* rather than *assumed* and in which audience features are allowed to vary delivers both good news and bad news for existing theories. The good news is that there are very minimal requirements for a dynamic to arise in which institutions can trigger noncompliance costs. The institution need only provide a public and costly mechanism for governments to use as a signal to domestic audiences, and the preferences of the government sending the signal need only be partially aligned with those of the intended audience. The bad news is that, even when the necessary conditions are met, the magnitude of noncompliance costs, and therefore their ability to influence government behavior as argued by existing theories, is constrained by the preferences and strength of those audiences. The institution cannot facilitate cooperation beyond the level desired by the audience.

The paper proceeds as follows: The next section reviews the relevant theoretical literature. The third section describes the model, its results, and describes initial corroborating evidence. The fourth section extensively tests specific predictions relating audience features to the timing of trade disputes. The fifth section concludes.

2 Audiences and Alarms

International cooperation entails governments making mutually-beneficial policy adjustments, but the costliness of these adjustments makes defecting from cooperation, i.e. noncompliance, tempting.[8] International institutions help generate noncompliance costs, making defection less attractive. Since most institutions lack independent enforcement powers, many theories examine domestic sources of noncompliance costs.[9] In one well-known example, Simmons (2000) argues that a government's IMF Article VIII obligation "mobilizes a new set of external actors (private economic, governmental, and legal) who may exert pressure to comply on a government that is considering

[8] Keohane (1984).

[9] A related explanation considers retaliation by other member states, often in a repeated-play setting. Here, I focus on domestic noncompliance costs as opposed to costs incurred when a defection triggers punishment from other member states.

or engaging in rule violation" (pg. 821). Yet, the audiences who potentially impose noncompliance costs often cannot perfectly monitor government behavior: a group of firms may find it costly to pool resources and organize into a special interest group to track all relevant government policies; voters may not know whether their government has erected illegal trade barriers and face a collective action problem in deciding to gather and act upon this information; a private investor may not be certain about whether a potential host government is likely to expropriate their investments. International institutions ameliorate this monitoring problem because they help uninformed audiences gain information about government behavior, empowering them to discourage or deter noncompliance.[10]

Audience punishment is an important component of recent theories of international trade. Mansfield, Milner and Rosendorff (2002) argue that countries join trade agreements to assure domestic audiences that economic shocks are not due to bad policies. Without this assurance, audiences would be more likely to punish elected officials for bad economic outcomes. Kono (2006) argues that policymakers obscure certain trade policies in order to avoid potential backlash from audiences harmed by those policies.

However, audiences are often assumed to have two features: (1) they support compliance and (2) they have the capacity to impose costs on governments that defect.[11] In reality, audiences vary significantly along both dimensions. With regards to preferences, audiences do not always support policies that are consistent with their government's international agreements, and often support defections. In the case of trade and the WTO, domestic political audiences often support protectionist measures and oppose compliance with adverse WTO rulings. Support for free trade can vary across individuals,[12] and can also vary across time, waxing or waning depending on macroe-

[10] Keohane (1984); Milgrom, North and Weingast (1990).

[11] For a notable exception, see Rickard (2010) which analyzes how different electoral systems amongst democracies and the preferences of their constituents affect compliance behavior.

[12] Mansfield and Mutz (2009); Hays, Ehrlich and Peinhardt (2005).

conomic conditions[13] When times are tough economically, protectionism gains public support.[14] Similar variation occurs in other contexts in which domestic noncompliance costs are important for cooperation. Domestic constituents vary in their support of a government that discriminates against foreign investment, and foreign investors vary in the degree to which they fear expropriation; citizens vary in the degree to which they demand that their government address human rights violations in other countries, etc.

Audiences also vary in their ability to inflict costs on defecting governments. In making trade policy, some governments care more about the welfare of special interest groups relative to the broader public, while others place greater weight on aggregate welfare.[15] Regime type is frequently linked to cross-national variation in the degree to which governments care about broader audiences or constituencies.[16] Government sensitivity to audience preferences also varies temporally. According to the vast literature on the political business cycle, in the run-up to elections, politicians are particularly attuned to the preferences of their constituents.

Why would variation in the preferences and strength of audiences affect theories of noncompliance costs? To generate intuition, consider a related literature on domestic constitutional courts. Like most international institutions, domestic courts lack independent enforcement power. How then, can domestic courts constrain policymakers who might otherwise be free to ignore their rulings? The answer for many domestic courts scholars is based on the audiences who observe those rulings.[17] As Georg Vanberg (2005) writes:

> ... the interactions between courts and other policymakers do not occur in a vacuum... If citizens value judicial independence and regard respect for judicial rulings as important, a decision by a elected official to resist a judicial ruling may result in a loss of public support... The fear of such a backlash can be a forceful inducement to imple-

[13] Mansfield and Busch (1995); Bergsten and Cline (1983).
[14] **?**.
[15] Gawande, Krishna and Olarreaga (2009).
[16] This is the main focus of audience costs arguments in the crisis bargaining context (Fearon, 1994).
[17] Vanberg (2001, 2005); Carrubba (2005, 2009); Staton (2006).

ment judicial decisions faithfully (20).

A key insight of the domestic courts literature is that audience features affect judicial behavior. If the audience does not support adherence to a judicial ruling, policymakers are more free to choose policies to their liking and courts are less likely to rule against those policies.[18] Domestic courts strategically publicize important rulings, based on the anticipated reaction of public audiences.[19] Carrubba (2005) analyzes an international cooperation setting, showing how an institutional mechanism that reveals the costs of noncompliance can help governments better coordinate their punishment strategies.

I model and empirically test similar intuition here. An audience's reaction to learning about government policies once an institutional alarm is sounded depends on the audience's preferences. A compliance-supporting audience might react negatively to learning that its government has broken its international obligations, while a *non*compliance-supporting audience might react with ambivalence or even support. The political strength of the audience magnifies these effects. For a noncompliant government, punishment from a strong pro-compliance audience is worse than punishment by a weak audience.

Audience features also affect the decision over whether or not to use an international institution to transmit information in the first place. In many international institutions, the sounding of the alarm is not automatic, but rather a strategic decision made by member states. Information about noncompliance is only transmitted when one government makes the strategic decision to use the institution to sound the alarm, e.g. with a legalized dispute. The anticipated audience reaction affects whether a prospective litigant will find it worthwhile to initiate a potentially costly dispute. The prospect of activating a strong, compliance-supporting audience is most attractive because of the possibility that audience can pressure their government to comply. Governments facing potential backlash from politically strong pro-compliance groups might be less inclined to defect in

[18] Vanberg (2001, 2005).
[19] Staton (2006).

the first place, while a government facing a weak backlash might be less fearful of the repercussions from defections.

2.1 Relevant Literature on Trade Disputes

Since I will test predictions relating audience features to the timing of WTO disutes, it is useful to briefly summarize some context-specific literature. For IPE scholars, WTO disputes, where one member "sues" another over WTO-illegal trade barriers, are an oft-studied empirical phenomenon. However, existing studies of DSU disputes focus on explaining the *occurrence* of disputes rather than the *timing* of disputes, while this analysis is (to my knowledge) the first that examines both.

Legal factors help explain dispute occurrence. If a particular tariff is WTO-legal, then it is less likely to be targeted with a DSU dispute. Countries with higher legal capacities initiate more disputes[20] and countries consider the relative attractiveness of different legal venues.[21] Some countries file disputes to placate domestic firms, and firms in "static" industries who can tolerate the lengthy DSU process more strongly lobby their government for litigation.[22] Disputes are also more likely over higher-stakes issues.[23]

While all of these are undoubtedly important explanations for dispute *occurrence*, they have less leverage over dispute *timing* since they focus on variables that are largely time-invariant. For example, Sattler and Bernauer (2011) argue for a gravitational explanation of disputes: dyads involving larger countries and trade flows experience more disputes. Yet there is much more variation in size and trade flows across dyads than within dyads, over time. While these explanators may change somewhat over time, e.g. WTO members might agree to change WTO law such that a previously-legal practice becomes illegal, they are less well-equipped to explain variation in dispute timing.

[20] Busch and Reinhardt (2003); Busch, Reinhardt and Shaffer (2009); Guzman and Simmons (2005); Horn, Mavroidis and Nordstrom (1999).
[21] Busch (2007).
[22] Davis and Shirato (2007); Davis (2011).
[23] Bown (2005); Horn, Mavroidis and Nordstrom (1999).

Even within dispute-prone dyads, like the United States-European Union dyad, there is significant variation in the timing of disputes. For example, after the George W. Bush administration increased tariffs on European steel, the EU reacted immediately. The EU used the DSU to threaten and activate audiences that were politically important to the Bush administration. Specifically, the EU used the initiation of a WTO dispute to threaten retaliatory tariffs against orange growers in Florida and California and textile producers in the Carolinas, which were considered politically sensitive battleground areas.[24] By mobilizing those domestic audiences against the steel tariffs, the EU convinced the United States to back down. Yet, in other instances, the EU has waited months or years before targeting certain U.S. tariffs with a WTO dispute. The EU waited until June of 2003 before challenging one particularly contentious U.S. trade-policy practice, known as "zeroing," at the WTO, despite the fact that this practice had been in use for over a decade.[25]

To be sure, WTO disputes are not massive political issues that cause groundswell changes in audienc (public) opinion in the United States. But the notion that disputes increase the information available to the relevant audiences, like import-competing producers or downstream firms or individual consumers, is gaining microfoundational support. Pelc (Forthcoming) shows that WTO disputes significantly increase web searches related to the issues involved in the dispute, as those affected gather more information about relevant policies. In the above US-EU zeroing example, the WTO dispute increased broader awareness and media coverage of the issue in the United States. Figure 1 shows the number of U.S. newspaper and magazine articles covering zeroing over time. Until the WTO dispute, media coverage of zeroing was virtually non-existent. Coverage does not begin until June of 2003, shortly after the WTO dispute. After that, media coverage of zeroing increases sharply, even reaching the pages of the New York Times and Washington Post.[26] While

[24]See Sanger, David E., "Backing Down on Steel Tariffs, U.S. Strengthens Trade Group," The New York Times, December 5, 2003; "Steeled to reality," The Times London, December 6, 2003; Brummer, Alex, "Bush backs down on steel," Daily Mail London, December 5, 2003.

[25]When U.S. bureaucracies investigate firms' petition, they calculate dumping margins, or the amount below fair market price that the goods are being sold, across different companies and countries. In short, zeroing is an accounting trick to artificially inflate these margins.

[26]The two articles referenced are "A Trade Battle is Brewing Over U.S. Antidumping Fees," *New York Times*

these trade issues were far from "capturing the news cycle," Chang, Golden and Hill (2010) argue that increased media coverage can help the electorate hold politicians accountable.

The key here is *not* that disputes trigger immediate, intense backlashes for or against certain policies. Rather, the model, large-N empirics, and myriad examples below highlight the intuition that, before initiating disputes, potential plaintiffs take into account the political-economic calculus facing the defendant and how the defendant is likely to react given that calculus. Audience reactions are not the *sole* determinant of disputes, but they can affect decisions at the margin. When times are tough economically, it is easier for politicians to turn to protectionist measures that help "save jobs" or to stand defiant in the face of a WTO dispute. As economic conditions improve, it is politically easier to support free trade as a rising tide that lifts all boats. These conditions can thus affect the defendant's response to a dispute, and in turn, the value to the plaintiff of initiating a costly dispute. Variation in the defendant government's sensitivity to these reactions- i.e. according to electoral cycles- can magnify or mute the effect of economic conditions.

3 A Theory of Audience Features and Institutional Alarms

This section develops a model of the alarm dynamic in which audience features are allowed to vary and the decision to initiate a costly dispute is endogenous. For concreteness, I describe the model in terms of tariffs and international trade, but the model is generalizable to many international cooperation contexts where an international institution can help an uninformed domestic audience monitor government behavior.

Apart from formalizing the intuition described above, the model has two main benefits. First, it establishes the conditions under which noncompliance costs, like those described in many existing theories, arise endogenously. When those conditions are not met, theories of noncompliance costs

2/18/2004 and "Jumbo Shrimp Follies," *The Washington Post* 11/15/2004. There are over 100 hits using those search terms that occur after June 2003. The first mention of zeroing is in "European Commission Protests US Method Of Calculating Anti-Dumping Fees," *The White House Bulletin* 6/13/2003.

arising from domestic audiences are not logically consistent explanations for empirical findings. Understanding these conditions helps assess whether theories like those based on credible commitments or audience costs explain the effects of international institutions in particular contexts.

Second, the model generates empirically testable predictions about how audience features affect government behavior when an institution acts an alarm that triggers domestic noncompliance costs. In this section, I provide corroborating support for many features of the model. I leave a more extensive test of specific predictions using data on WTO disputes to the fourth section. Proofs of all propositions are contained in the appendix.

3.1 The Model

Two countries are trading partners and are members of an agreement that allows them to initiate costly disputes over each other's tariff policies. There are three players in the model: the government of the "Home" country, $Home$, the "Foreign" government, $Foreign$, and an $Audience$ within the home country. Each player cares about the tariffs, $t \in \Re$, that the home government levies against imports from the foreign country. The audience can be thought of as any group that lacks perfect information about the home government's tariff policies. For instance, "downstream" firms paying inflated prices for intermediate production materials may lack perfect information about the tariff policies responsible for those higher prices. Consumers who also pay higher prices as the result of tariffs are similarly uninformed about these policies. These audiences can potentially engage in some costly action to try and influence the home government's policies. For instance, firms could pay the costs associated with mobilizing into an organized interest group, or constituents can mobilize to punish elected officials or make campaign contributions to the other political candidate.

Each of the three players has preferences over the tariff set by the home government.[27] The

[27] In some models, like that of Mansfield, Milner and Rosendorff (2000), preferences over tariff levels are generated by an underlying economic model where groups with different factor endowments or technologies have different preferences over tariffs. For simplicity, I leave the microfoundations of these preferences unspecified, but their existence

foreign government prefers lower tariffs, and its preferences over tariffs are represented by the utility function: $u_F(t) = -t$. The audience has a most preferred tariff level, $t = A$, and its preferences over tariff policy are represented by the function: $u_A(t)$, which is maximized at $t = A$, concave, decreasing in t when $t > A$, and increasing in t when $t < A$.[28]

The home government's most preferred tariff policy, H, depends on its type. The home government can be a "good" government from the perspective of the audience, and have preferences identical to those of the audience, where $H = A$. Alternatively, the home government can be a "bad" type whose most preferred policy is $t = B > A$.[29] The preferences of the home government are represented by $u_H(t)$ and have the same properties as the audience's utility function, apart from the point at which the function is maximized. The probability of a bad home government, $Pr(H = B)$, is $\lambda \in (0, 1)$ and is commonly known. The audience does not observe their government's type.

The sequence of the game is as follows. First, Nature selects the home government's type. Next, the home government chooses their initial tariff level, t_1. The foreign government observes the home government's type and initial policy, and draws the costs to initiating a dispute, k, from a commonly known distribution, $F(k)$, which is uniform on the interval $[\underline{k}, \overline{k}]$, with $\underline{k} < 0 < \overline{k}$. These costs, k, should be thought of as any of the costs or benefits accrued by the foreign government apart from the dispute's possible effect on tariff policy. For instance, these costs could pertain to the actual litigation of legally pursuing a dispute, i.e. higher costs. Or they could reflect the domestic pressures to initiate a dispute, such as pressure from interest groups affected by tariffs, with more pressure to file a dispute acting like a reward for a dispute, i.e. lower costs.[30] The foreign

and the potential for preferences to diverge across groups is well established elsewhere.

[28] I describe a single audience as opposed to a collection of audiences for simplicity. The preferences of the audience could also be thought of as an aggregation of the preferences that arises in a common agency setting, like that of Bernheim and Whinston (1986) or Grossman and Helpman (1994).

[29] There are many ways that politics can drive a wedge between the preferences of the government and the preferences of a particular audience. For example, Grossman and Helpman (1994) model government preferences as an aggregation of concern for social welfare and special interest group contributions.

[30] Davis (2011) argues that some countries initiate WTO disputes as a way to placate domestic industries who may have been affected by unforseen adverse shocks.

government then chooses whether or not to initiate a dispute, D or $\sim D$. Whether or not the foreign government observes the home government's type does not affect the results described below, since the foreign government only cares about the home government's type insofar as it affects the home government's policies. To condense notation, I will refer to $F(k)$ and $f(k)$ as the distribution and accompanying density function for dispute costs.

The audience observes the foreign government's decision over whether to initiate a dispute and then decides whether to pay mobilization costs, $m > 0$, and mobilize to influence the policy chosen by the home government. If the audience chooses not to mobilize, $\sim M$, then the initial policy chosen by the home government, t_1, is the final policy. If the audience chooses to mobilize, M, then the home government chooses a new policy, t_2, and must partially internalize the preferences of their audience. Specifically, the home government must choose their post-mobilization final policy by maximizing an α-weighted combination of their own preferences and those of the audience: $U_H(t_2) = \alpha u_A(t_2) + (1 - \alpha)u_H(t_2)$.[31]

The decision to mobilize can be thought of as a decision to gather precise information about the home government's policy, mobilize politically to lobby the government, or make political contributions that are conditioned on changes to policy. All of these are costly actions that can make the home government pay more attention to the preferences of that audience. $\alpha \in [0, 1]$ represents how much the home government cares about the audience, should the audience mobilize. For example, if $\alpha = 1$, mobilization causes the home government to act as though it were a member of that group. If $\alpha = 0$, mobilization has no effect. Though the audience does not observe the initial policies chosen by the home government or the home government's type, they can potentially condition their mobilization decision on whether or not the foreign government initiates a dispute.

As noted above regarding the generalizability of the model, I describe the model in terms of tariffs, but t could be thought of as any policy covered by an international agreement, where

[31] This assumption is a reduced form of an electoral or political constraint. In the common agency settings mentioned above, the equilibrium policy chosen more heavily "weights" the interests of mobilized groups. The assumption made here says that after mobilization, the government must assign more weight to that group's preferences.

governments can choose policies that are more or less in compliance with their obligations. In pollution control agreements, governments comply by meeting their abatement targets or defect by retaining higher levels of pollution than allowed. In investment agreements, governments choose discriminatory policies, like tax breaks for domestic firms, that are more or less harmful to foreign investors.

Note, too, that the model does not describe the international institution itself as an independent player. This is a good thing: rather than assume that government interactions take place in the shadow of an institution that can detect violations of an agreement and impose noncompliance costs, the goal of this model is to derive a set of conditions under which these costs arise endogenously. This is *not* to say that is not useful to consider institutions as actors with their own preferences. Rather, the model helps microfound reasons why institutions are a prominent feature of the landscape of international cooperation by showing how and when they can be an important source of noncompliance costs in the way argued by many existing theories.

3.2 Credible Commitments Equilibrium

I first establish the conditions under which there exists an equilibrium in which the key features of existing credible commitments or audience costs theories arise endogenously. Qualitatively, these features are: (a) if a government violates an agreement and an another government sounds an institutional alarm, then the violating government suffers noncompliance costs and (b) the possibility of noncompliance costs encourages governments to cooperate more.

In this model, these qualitative features match an equilibrium with the following features, which I call a "credible commitments equilibrium" (CCE). In a CCE, disputes cause audiences to mobilize and impose noncompliance costs. Without the dispute, the audience does not mobilize. The foreign government initiates disputes strategically, i.e. when the expected benefits outweigh the costs. And finally, because of the possibility of a dispute and subsequent mobilization, governments who would otherwise be tempted to defect (bad home governments) choose more compliant

initial policies. Formally, a CCE is one in which:

Definition 1. *In a credible commitments equilibrium (CCE):*

- *The audience chooses* $M|D$ *and* $\sim M| \sim D$
- *The foreign government chooses* $Litigate$ *if* $t_1 - t_2^* \leq k$
- *Good home governments choose* $t_1^* = A$ *and* $t_2^* = A$
- *Bad home governments choose* $t_1^* \in (A, B)$ *and* $t_2^* \in (A, t_1^*)$

Proposition 6 formally describes the conditions under which a CCE exists.[32]

Proposition 1. *A CCE exists if and only if:*
(i) $Pr(H = B| \sim D)[u_A(t_{2b}^*) - u_A(t_{1b}^*)] \leq m \leq Pr(H = B|D)[u_A(t_{2b}^*) - u_A(t_{1b}^*)]$
(ii) $Pr(H = B|D) > Pr(H = B| \sim D) > 0$.[33]

Condition (i) of Proposition 6 says that mobilization costs must be "just right." They must be high enough to keep the audience from always mobilizing and low enough to allow them to mobilize when they observe a dispute. If mobilization costs were too low, then the audience would want to mobilize even in the absence of a dispute, causing the foreign government to always eschew disputes, since they don't gain any additional benefits from a dispute. If mobilization costs were too high, the audience would not want to mobilize, even after observing a dispute, again causing the foreign government to avoid disputes.

Condition (ii) says that disputes must make audiences think their government is being less cooperative. This condition is straightforward in terms of the intuition of signalling models, but

[32] I do not derive other equilibria for the game, because the goal is to derive the conditions under which often-described theories arise endogenously. The CCE equilibrium matches those theories. It is possible, and indeed likely, that there are other equilibria, but they would not have these features.

[33] Full expressions for these probabilities are provided in the appendix.

counterintuitive in its implications for the role of litigation costs in international dispute settlement. Condition (ii) says that the audience's posterior beliefs must put more weight on the probability that their government is bad after observing a dispute than in the absence of a dispute. The signal, i.e. the dispute, that the audience receives has this effect because litigation is costly, and therefore informative, to the audience. If litigation costs were too low, as would be the case if the foreign government relied on press releases or other inexpensive media outlets to highlight the home government's noncompliance, then the audience would not gain enough information from the signal to justify spending mobilization costs. The optimal level of litigation costs, from the audience's perspective, is not zero. If the audience could pick the distribution of litigation costs, they would balance two concerns: on the one hand, they want the signal to be sent often, but on the other hand, they want the signal to be withheld frequently enough so that it retains its informative value.

The costliness of different dispute settlement institutions affects the degree of scrutiny that government policies received from disputes and explains why some dispute settlement bodies have much higher profiles than others.[34] In 1999, Chile increased tariffs on vegetable oils from Argentina which had a significant effect on Argentine vegetable oil exports to Chile. Argentina first tried to address the tariffs bilaterally, and then through MERCUSOR's dispute settlement system. Chile refused to adjust the tariffs, and even strengthened them. Argentina then took Chile to the WTO's dispute settlement mechanism in 2000. Describing Argentina's experience with regional dispute settlement, Tussie and Delich (2005) observe that "The [MERCUSOR] dispute system was out of the public eye and at the same time it was both fast and low-cost. Chile did not, meanwhile, modify its reclassification." In contrast, their description of Argentina's experience with the WTO's dispute settlement mechanism notes both the costliness and additional exposure gained from the WTO's mechanism relative to MERCUSOR's:

[34]By one estimate, a typical WTO dispute costs the litigants one million dollars apiece- a nontrivial sum when considering the size of the bureaucracies charged with handling WTO litigation, especially in small countries. Disputes also entail an opportunity cost of using litigation resources for other potential violations Davis and Shirato (2007). For countries unfamiliar with the DSU process, gaining experience about this legal arena entails the start-up costs of learning to argue effectively in front of the DSU Davis and Bermeo (2009).

> Although accessible only to highly profitable sectors because participation is too costly and time consuming, the WTO provides the intangible benefit of exposure. Pressure through exposure can help countries unable or unwilling to retaliate to obtain more favourable results than in bilateral or regional instances.

Condition (ii) also shows how the existence of a CCE also requires the partial alignment of preferences between the foreign government and the audience. The signal sent by a foreign government whose preferences diverge significantly from the audience's is less effective at triggering mobilization. If the foreign government wants tariffs that are much lower than those preferred by the audience, then the audience is less likely to mobilize after a dispute. When the home government chooses a tariff that is higher than the audience's and the foreign government's ideal policy, the foreign government and the audience both prefer lower tariffs than the home government. This "alignment" of preferences facilitates the ability of a dispute to transmit information.

However, if the audience prefers higher tariffs than the home government, this information transmission dynamic breaks down. If the audience preferred higher tariffs than the government, and disputes caused those audiences to mobilize, then the foreign government would not want to ever initiate disputes for fear of activating a protectionist audience. In such a case, the foreign government would only file disputes when they drew sufficiently negative litigation costs to offset the worsening of policy that resulted from the dispute. Snyder and Borghard (2011)'s recent critique of the theory of audience costs in the context of crisis bargaining notes how the omission of audience preferences in most theories of audience costs is important, because of the possibility that the public has *more* hawkish or dovish preferences than their political leaders.

An example of dispute settlement activating an extreme audience arose in a WTO dispute between Japan and the European Communities as plaintiffs and Canada as the defendant.[35] In 1965, Canada and the United States signed a bilateral agreement that lowered tariffs on trade in

[35]For ease, I use the more familiar "plaintiff/defendent" terminology, rather than the DSU-appropriate "complainant/respondent" terms.

the auto industry. Approximately four years after the entry into force of the new WTO regime, in 1994, Japan and the European Communities challenged U.S. Canada auto agreement at the WTO's new dispute settlement body on the grounds that the pact violated the WTO's Most Favored Nation (MFN) rules against providing special treatment to only select trading partners. Credited with generating significant economic growth, the auto pact was very popular in Canada and was supported strongly by interest groups representing the auto sector. As a result, the audiences activated by the WTO dispute proved extremely hostile to changing this policy in the way desired by the plaintiffs. According to one observer:

> ... there was considerable public pressure on federal officials to take a strong stand not only in favour of the cherished Auto Pact but also against 'interference' by an international body on a matter of domestic public policy. Once the WTO claim was made public, the significant media attention and the corresponding 'court of public opinion' limited the government's ability to enter into a negotiated settlement. At that point, the government had virtually no choice but to defend the Auto Pact vigorously even in the face of certain defeat (Krikorian (2005)).

Ironically, the end result of the WTO dispute was for Canada to *raise* its tariffs, applying them to more countries, in order to comply with MFN rules. To be sure, miscalculations like this by plaintiffs are rare. Yet they show how the ability of dispute settlement to activate domestic audiences is not always a force for increasing the amount of international cooperation associated with an international institution.

3.3 Effects of Audience Features on Equilibrium Behavior

The model also shows how audience features affect a variety of decisions made by each actor. Audience features affect the post-dispute policy chosen by governments, the decision to initiate

disputes, and the policies chosen by governments in the shadow of possible disputes. I consider each in turn.

3.3.1 Effects of Audience Features on Post-Dispute Policy

First, consider the effects of audience features on post-dispute policy. If disputes can trigger audience mobilization, then how would mobilization affect the home government's updated policy? Formally, Proposition 7 and Corollary 2 describe how audience features affect the home government's optimal post-dispute policy, t_2^*.

Proposition 2. *The optimal post-mobilization policy,* t_2^* *satisfies:* $\frac{\alpha}{1-\alpha} = \frac{u'_H(t_2^*)}{-u'_A(t_2^*)}$.

Corrollary 1. *In equilibrium:*
(i) $\frac{\partial t_2^*}{\partial A} > 0$*, (ii)* $\frac{\partial t_2^*}{\partial \alpha} < 0$*, and (iii)* $\frac{\partial t_2^*}{\partial B} > 0$*, for bad home governments.*

Proposition 7 says that after a dispute, the home government balances its own preferences over policy with the preferences of the audience. Corollary 2 shows that the audience's preferences and the post-dispute policy chosen by the government move in tandem. As the audience or the home government prefer higher tariffs, the home government will choose higher tariffs after mobilization.[36] However, the effect of the audience's preferences on post-dispute policy is conditioned by the audience's strength. As the audience's strength increases, the optimal policy decreases. Stronger audiences "pull" the optimal policy downward, with greater weight, towards the ideal policy of the audience.[37]

The empirical findings of Dai (2007) are consistent with this *conditional* relationships between audience preferences and strength. Analyzing the 1985 Sulfur Protocol of the LRTAP convention,

[36]From Proposition 7, for a fixed α, increasing A means that u'_A increases by the concavity of u_A, so u'_H must increase, which means a higher t_2^* by the concavity of u_H. The same argument applies for increases in H.
[37]Increasing α means $u'_H(t_2^*)$ must increase and $u'_A(t_2^*)$ must decrease, implying that t_2^* must increase.

she finds that countries with pro-compliance (pro sulfur-reduction) interest groups that were politically stronger and better able to monitor their governments enacted policies that resulted in greater reductions in sulfur emissions.

3.3.2 Effects of Audience Features on Dispute Decisions

The foreign government chooses to initiate a dispute when the benefits outweigh the costs. In a CCE, the foreign government benefits from a dispute since it causes the audience to mobilize and thus change the home government's policy. Audience features affect the degree to which mobilization causes the home government to change its policy, which, in turn, affects the probability that the costs of a dispute will be lower than the benefits. Formally, Proposition 8 shows how audience features affect the probability of a dispute.

Proposition 3. *For a fixed initial tariff,* t_1*, and, when* $H > A$*, the probability of a dispute,* $\Pi(t_1)$*, is: (i) decreasing in* A*, (ii) increasing in* α*, and (iii) decreasing in* H*.*

For a particular initial policy,audience features have straightforward effects on the probability of a dispute. As the audience prefers lower tariffs, the foreign government's expected gains from mobilizing that audience with a dispute increase, which expands the range of litigation costs over which the foreign government's gains outweigh their costs. As the audience grows stronger, the benefits from a dispute also increase, increasing the probability that the foreign government will draw litigation costs low enough to justify a dispute. The ideal audience for the foreign government to mobilize with a dispute is one that prefers lower tariffs *and* which has more sway over their government's policies. Audiences that prefer higher tariffs do not make attractive allies for the foreign government. Similarly, impotent audiences are not worth paying litigation costs to activate. As the home government prefers higher tariffs, it will be more recalcitrant in the face of a mobilized audience, which makes disputes less attractive.

3.3.3 Effects of Audience Features on Pre-Dispute Policies

The model also shows how audience features affect the degree to which government policy choices are constrained *ex ante,* in the shadow of potential disputes. Formally, Proposition 9 describes how audience features affect the home government's optimal initial policy.

Proposition 4. *The home government's optimal initial policy, t_1^*, is: (i) increasing in A, (ii) decreasing in α, and (iii) increasing in H.*

Proposition 9 shows how audiences features can magnify or constrain the ability of dispute settlement mechanisms to affect member state behavior, *ex ante*. Governments who want higher tariff levels face the following tradeoff: they can raise their initial tariff levels, which is better for them if they avoid a dispute. But at the same time, choosing a higher initial tariff increases the probability of a dispute by increasing the relative attractiveness of a dispute to the foreign government.

As the audience prefers lower tariff levels or facing a stronger audience, the home government must make policy in the shadow of potentially more severe consequences from audience mobilization. Stronger potential audiences who prefer lower levels of tariffs make dispute settlement a stronger deterrent to higher initial tariffs for bad governments. In the domestic courts literature, this phenomenon has been referred to as "autolimitation."[38] When faced with the prospect of costly judicial review, legislatures may propose more moderate policies than they would have in the absence of any threat of judicial review. The same is true of governments facing the prospect of audience backlash resulting from a dispute. When audience punishment is more costly, governments choose more compliance policies *ex ante* in order to decrease the likelihood that they will face such punishment.

However, these results also show how the ability of dispute settlement to affect the home government's behavior is tempered by features of the audience. As the audience prefers higher tariff

[38] Vanberg (2005, 1998).

levels, the home government is less constrained by dispute settlement and chooses higher initial tariffs. Similarly, when facing weaker audiences, the specter of a dispute and potential audience mobilization is less frightening.

3.3.4 Effects of Audience Features on Equilibrium Dispute Probability

The effect of audience features on the home government's initial policy choice complicates a description of how audience features affect the equilibrium probability of a dispute. On the one hand, a more favorable audience from the foreign government's perspective (audiences that are strong and like lower tariffs) makes a dispute *more* likely. Favorable audiences have a *post-dispute effect*, meaning the foreign government can induce larger changes in the home government's policies after a dispute, as shown in Proposition 8. On the other hand, Proposition 9 says that more favorable audiences also have a *pre-dispute effect*. The home government anticipates its audience's reaction when choosing its initial policy. Better audiences therefore lower the probability of a dispute by making the home government choose lower initial tariffs.

Proposition 10 describes the conditions under which each effect dominates when considering the equilibrium probability of a dispute, $\Pi(t_1^*)$.

Proposition 5. *If* $f(t_1^* - t_2^*)u'_H(t_2^*) \leq -[1 - F(t_1^* - t_2^*)]u''_H(t_1^*)$ *then* $\frac{\partial \Pi(t_1^*)}{\partial A} \geq 0$ *and* $\frac{\partial \Pi(t_1^*)}{\partial \alpha} \leq 0$

Proposition 10 says that which effect dominates depends on the curvature of the players' utility functions and the shape of the distribution of litigation costs. More importantly, Proposition 10 shows why careful attention needs to be paid to linking the occurrence of disputes with compliance. An often-used dispute settlement mechanism may not be an effective one, if the frequency of its use reflects its failure to deter initial violations. A rarely-used dispute settlement mechanism may, in reality, be the most effective if governments refrain from severe violations because they fear the possibility of a dispute.

One way to gain empirical leverage on the effects of audience features on the probability of a

dispute is to consider how connected the pre- and post-dispute decisions are for the home government. Empirically linking audience features to the probability of a dispute is most straightforward when the government's initial decision is distinct from its post-dispute compliance decision. In other words, if the pre-dispute effect of audience features is negligible, i.e. the home government does not anticipate possible audience reactions when making its initial decision, then we can apply the intuition of Proposition 8. In the following empirical section, I return to this question by assessing evidence anticipatory behavior, in choosing initial policies. In the context considered below, I do not find such evidence, but it is possible that, in other contexts, anticipatory behavior makes it difficult to empirically link dispute occurrence with cooperation.

4 The Timing of Trade Disputes

This section uses data on the timing of WTO disputes against the United States to empirically test one of the model's main predictions- that variation in audience features affects the timing of disputes. Proposition 8 says that foreign governments should be more likely to initiate disputes when the home government is more sensitive to the preferences of audiences who prefer *lower* tariff levels. On the other hand, the foreign government is less likely to initiate disputes when the home government is more sensitive to the preferences of audiences who prefer *higher* tariff levels. In this section, I show how electoral dynamics, which affect government sensitivity to the preferences of broader constituencies, and macroeconomic conditions, which affect preferences for tariffs and protectionism, *jointly* influence the probability that the United States' trading partners initiate WTO disputes over certain U.S. tariffs. The key finding is support for this conditional hypothesis: during election years, as unemployment increases, U.S. trading partners are less likely to initiate WTO disputes against U.S. tariffs.

4.1 AD and CVD Background

Before proceeding with a precise description of the data, it is useful to provide background information on the particular set of "potential disputes" considered here, i.e. U.S. tariffs that trading partners could potentially object to at the WTO. These tariffs are the result of Antidumping (AD) and Counterveiling Duty (CVD) petitions. In the United States, domestic producers can file petitions with federal bureaucratic bodies- the International Trade Commission (ITC) and Department of Commerce (DOC)- requesting that tariffs be levied against foreign goods when those exporters are "dumping:" selling products in the United States at below market price. After a U.S. firm files a petition, the relevant bureaucracies evaluate whether dumping is indeed occurring and whether the U.S. firm has been harmed. If so, they issue an affirmative preliminary ruling, and place tariffs on the goods in question.[39] The bureaucracies and U.S. petitioning firms then enter into a lengthier evidence-gathering phase in order to make a final ruling. If the bureaucracies issue affirmative final rulings, the preliminary duties stay in place until they expire or are revoked when dumping is deemed to have ceased. Petitions are very successful at the preliminary stage, with the majority receiving an affirmative preliminary ruling.

The tariffs resulting from AD and CVD petitions have been a particularly contentious issue at the DSU, with foreign exporters initiating numerous disputes against the United States over its use of AD and CVD remedies. Disputes concerning these petitions make up a large part of the DSU's caseload, and in virtually every case concerning these tariffs, the WTO has ruled in favor of the plaintiff on at least one legal issue.[40] AD and CVD cases also account for a large proportion of the WTO litigation targeting the United States: of the 111 instances in which the United States has been named as a respondent in a WTO dispute since 1995, 42 (approx. 38%) were focused primarily on AD and CVD actions.[41] The AD and CVD processes have thus often generated

[39]The CVD process is slightly different from the AD process, but they are similar enough for the analysis here. The description here most closely describes the AD process.

[40]Bown 2005, pp. 516-517.

[41]This tally actually understates the importance of AD and CVD petitions to the United States' experience with the DSU since I only counted disputes which specifically referenced AD or CVD in their official WTO DSU title.

DSU-actionable trade barriers and foreign governments largely have been successful in their legal challenges.[42]

Yet the tariffs resulting from AD and CVD petitions and their subsequent WTO disputes are very illustrative of the puzzle posed at the beginning of this paper. If sounding the institutional alarm causes governments to return to compliance, then why don't governments who are victims of noncompliance sound the alarm immediately? Figure 2 depicts the "lifespan" of AD and CVD tariffs, showing how they are initiated, proceed, and are possibly removed. Theoretically, the foreign country targeted by the AD/CVD petition can initiate a WTO dispute regarding that particular petition at any point. In practice (and in the sample described below), WTO disputes are only initiated after affirmative preliminary rulings (after t_1) and before any terminating event (before t_2 or t_3).

Figure 3 shows the distribution of the length of time elapsing between t_1, an affirmative preliminary ruling, and the time at which the foreign government initiates a DSU dispute over that tariff.[43] Some tariffs are challenged relatively quickly; the foreign government requests DSU consultations within a few months of the affirmative ruling. Other tariffs are in place for years before the foreign government challenges them at the DSU. These delays are substantively important. Every interval that a WTO-illegal tariff is in place, when it could have been addressed by a dispute, represents forgone cooperation and decreased trade levels which directly harms foreign exporting firms and can have significant chilling effects on trade flows overall.[44]

[42] To be sure, the occurrence of AD and CVD petitions is not random and some AD and CVD tariffs are WTO-legal. In a later section, I show how this is unlikely to be a problem for this analysis.

[43] This figure is limited to the petitions that received affirmative rulings after April 1994 and were petitions against WTO members, since only WTO members can use the DSU.

[44] Vandenbussche and Zanardi (2010).

4.2 Data

I first use Chad Bown's Global Antidumping Database and extract all AD and CVD the petitions filed by U.S. firms from April of 1994 to October of 2009.[45] Each observation in the Bown dataset describes one petition and contains information on the time of its initiation, the target country, the rulings of the relevant U.S. bureaucratic bodies at the various stages of the process, the dates of these rulings, and any resulting WTO litigation.[46]

To take advantage of the variation in the covariates described later, I break each petition into monthly observations, so the unit of observation is the petition-month. I first begin observing a petition in the month that it receives the necessary affirmative preliminary rulings, and is awaiting a final ruling. As described above, this is the first stage of a petition's lifespan in which tariffs are applied. Petitions that do not pass the necessary preliminary rulings do not result in tariffs.[47] For clarity, I refer to petitions that have received affirmative preliminary rulings as "tariffs."

After a petition receives an affirmative preliminary ruling, the resulting tariff can experience three possible events over the course of its lifespan: a WTO dispute, a negative final ruling, or revocation. A *WTO Dispute* occurs in the month in which the country targeted by a particular AD/CVD tariff formally requests DSU consultations over that tariff. A tariff can also receive a negative final ruling from the relevant U.S. bureaucracies or be revoked, both of which terminate the tariff. I group the final two events, negative final ruling and revocation, together and label them as *Unilateral Removal*, because these events both stem from decisions made by U.S. actors, while

[45] I focus on the United States because it has regularly scheduled elections, which gives exogenous variation on government sensitivity, as opposed to the additional complication of analyzing countries with endogenously determined elections. The United States is also a "hard case" since trade disputes take on a much lower profile than in other countries.

[46] The choice of the starting date reflects important institutional changes to the WTO. April of 1994 marks the date of agreement for the transition from the old GATT regime to the new WTO regime, which included significant changes designed to strengthen the dispute settlement mechanism. These changes went into effect in January of 1995. I exclude AD/CVD petitions filed earlier in order to hold the institutional rules of the dispute settlement mechanism fixed throughout the analysis. I also excluded petitions that were filed against countries that were not WTO members at the time of filing. This ensures that the foreign country targeted by the petition is able to initiate a DSU dispute against the United States for the entire lifespan of the petition.

[47] For the petitions that received affirmative preliminary rulings before January of 1995, I only begin observing these petitions in January of 1995, since this is when aforementioned institutional DSU changes go into effect.

a *WTO Dispute* is a decision made by foreign actors. I draw the distinction between *WTO Dispute* and *Unilateral Removal* because it allows me to examine whether the effects of the explanatory variables differ across the type of event under consideration. *WTO Dispute* and *Unilateral Removal* are called "terminating events," and I do not observe tariffs after either terminating event has occurred.[48] If neither terminating event occurs in a particular month, the tariff is labeled as *In Effect*, and it is possible for a tariff to still be in effect at the end of my observation time period, October of 2009.

The dependent variable, Y_{it}, is a categorical variable describing the "status" of the tariff i in month t. Y_{it} takes on a distinct numerical coding depending on whether the tariff is *In Effect* or experiences a *WTO Dispute* or *Unilateral Removal*.[49] Of the 574 tariffs, approximately 14% (78 tariffs), resulted in a WTO dispute before October of 2009. Approximately 55% (318 tariffs) ended because of unilateral removal. Tariffs that resulted in a WTO dispute were in effect for approximately 77 months, with a minimum of 8 and a maximum of 252. Tariffs that were removed unilaterally were in effect for an average of 96 months, with a minimum of 10 and a maximum of 294.

4.3 Main Explanatory Variables

The theory's main prediction is that disputes are more likely when domestic audiences support free trade and when the U.S. government is most sensitive to those preferences. To proxy for domestic support for free trade, I use the U.S. unemployment rate. As described above, unemployment is the one of "usual macroeconomic suspects" associated with general support for free trade.[50]

[48] In practice, petitions can also be withdrawn by the petitioner. In these data, the only instances of withdrawal of petitions against WTO members occurred before preliminary rulings, which is before I begin observing the petition. For withdrawals, see: Prusa (1992).

[49] In the parlance of survival models, each tariff is a particular subject. A subject is "born" in the month when the petition passes its preliminary rulings and is awaiting a final ruling. A subject "dies" in the month that it experiences a terminating event. Subjects that do not experience any terminating events before the end of the observation window are right-censored. Petitions filed before January 1995 but after April 1994 are left-censored until January 1995.

[50] Unfortunately, public opinions polls very sporadically ask questions regarding free trade, making time-series data on public opinion regarding free trade sparse.

U.S. Unemployment is a six month moving average of the monthly, seasonally adjusted percentage unemployed in the United States.[51]

To proxy for the government's sensitivity to support for free trade, *U.S. Election Year* is an indicator variable that is coded 1 in the twelve months preceding the next U.S. Presidential election, and zero otherwise. I focus on Presidential elections because the bureaucracies involved in AD and CVD petitions are most closely tied to the executive branch. Additionally, executives are thought to be more responsive to broader constituencies than more narrowly-interest legislative members. Since the theory makes a conditional prediction for these variables, I interact *U.S. Unemployment* and *U.S. Election Year*.

The ideal data would measure preferences and strength of dispute-specific audiences. In other words, it would be preferable to measure features of the audiences affected, positively or negatively, by the tariffs entailed in particular petitions- as in the US-EU steel tariffs example. The scope of this paper and the diversity of the sample make this difficult for the current analysis, which is why I focus on more "aggregated" measurements of preferences and strength.

According to the theory, during election years, higher unemployment should be associated with a lower probability of a WTO dispute. But the theory does not make predictions about the effects of unemployment and elections on the probability of *Unilateral Removal*. This is an attractive feature of my approach, since it creates an informal "placebo test" of the theory. If unemployment and elections have the predicted effect on the probability of a WTO dispute, but do not have the same effect on the probability of unilateral removal, then the results are more supportive of the theory.

[51] Unemployment data are from the Bureau of Labor Statistics, $http://www.bls.gov/$, Series ID: LNS14000000, and were accessed on February 16, 2010. The moving average includes the current month and the five preceding months. I use moving averages to capture broader economic trends, rather than transitory shocks. Results are similar using one month or twelve month moving averages for all the variables that are averaged.

4.4 Alternative Explanatory Variables

I also include two variables that measure the potential for retaliation- where country A raises tariffs against country B's exports as punishment for B's tariffs. If the defendant exports a large amount to the plaintiff, disputes should be more likely since the plaintiff has greater trade leverage. When the plaintiff exports more to the defendant, they have less leverage. Retaliation should also increase the probability of unilateral removal. Blonigen and Prusa (2001) show that the possibility of retaliation decreases the probability that U.S. bureaucracies rule in favor of firms seeking protection. *U.S. Exports* measures the percentage of U.S. exports that go to the foreign country and *U.S. Imports* measures the percentage of U.S. imports that come from the foreign country.[52]

The second set of alternative explanations account for plaintiff-side dynamics. I include the most commonly used proxy for a country's legal capacity: their per capita GDP. The data for *Plaintiff PCGDP* come from the World Development Indicators dataset, measured yearly. Macroeconomic and electoral dynamics in the plaintiff country may also affect the probability of a dispute. *Plaintiff Election* is an indicator variable that is coded 1 if the foreign country is within 12 months of its next major election, and zero otherwise. *Plaintiff Unemployment* codes the unemployment rate for the plaintiff country. As with U.S. elections and unemployment, I also include their interaction.

4.5 Empirical Models

I estimate the effects of the explanatory variables on the status of a tariff (*In Effect, WTO Dispute, Unilateral Removal*) in two ways. First, I use a Cox proportional hazards model to estimate the effect of the variables on the risk of a *WTO Dispute* for tariff i at time t: $h(t|X_{it}) = h(t)exp(X_{it}\beta)$.[53] This approach has the advantage of being able to estimate the effects of the explanatory variables

[52] Again, I use six month moving averages. Trade data are from the U.S. International Trade Commission, $http://dataweb.usitc.gov/scripts/INTRO.asp$.

[53] The dependent variable is an indicator variable that equals 1 if the tariff experienced a *WTO Dispute* during that month, and zero otherwise.

on the risk of a *WTO Dispute*, while leaving the underlying, or baseline risk, of a *WTO Dispute* during time t, $h(t)$ unspecified.[54]

The second approach accounts for the possibility of competing risks between the two events. In the data, when one terminating event occurs, it precludes the other event from occurring, e.g. when a tariff is unilaterally removed, it cannot then experience a WTO dispute. The Cox approach is best when the risks of a *WTO Dispute* and *Unilateral Removal* are independent.[55] Theoretically, there are reasons to suspect that the two risks are not independent. For instance, if a country decided not to initiation a WTO dispute because it thought that the tariff was likely to be unilaterally removed, the independence assumption would be violated.

To account for this possibility, I also model the probability of the two events jointly, using a Bayesian multinomial probit (MNP) model from Imai and van Dyk (2005) which does not require assumptions of independent risks.[56] The MNP also allows me to compare the effects of the explanatory variables on both risks, analyzing the direction and magnitude of each variable on the risk of a *WTO Dispute* and *Unilateral Removal*.

[54]Here, I treat *Unilateral Removal* as instances of right-censoring. Note that time, t, is measured from the month that the petition receives an affirmative preliminary ruling, i.e. $t = 1$ refers to the first month of a tariff's lifespan. This is distinct from calendar time. I will control for possible trends in calendar time by including quadratic polynomials that measure calendar time, i.e. *Month* $= 1$ refers to the first month in the sample (January of 1995).

[55]See Sueyoshi (1992, pp. 30). In the latent failure time approach to time-until-failure analysis, each observation, i, has a latent failure time, T_{ij}, for each of the j competing risks. We only observe the first failure, $min(T_1, T_2, ..., T_j)$. The independence assumption says that these latent failure times, the T_{ij}'s are conditionally independent of one another.

[56]See Empirical Appendix for details. The MNP model is useful when the dependent variables takes one of any of a number of distinct values, and is often associated with models of discrete choice, where an agent chooses from a menu of options. The MNP is often preferred to the multinomial logit (MNL) model because the MNP does not require an Independence of Irrelevant Alternatives (IIA) assumption. The IIA assumption made in the MNL approach is similar to the assumption of independence of competing risks in the time-until-failure approach.

4.5.1 Results: Risk of a WTO Dispute

Table 1 shows the coefficients estimated from a series of Cox model specifications.[57] The first model includes only the main explanatory variables and the retaliation variables: *U.S. Elec. Year*, *U.S. Unemployment*, their interaction, *U.S. Exports* and *U.S. Imports*. The second model adds variables describing Plaintiff-side dynamics: *Plaintiff PCGDP*, *Plaintiff Unemployment*, *Plaintiff Election* and the relevant interaction. The third and fourth models account for possible calendar year trends with a counter variable that begins at 1 for the first calendar month of the dataset. I also include the quadratic expansion of the counter.

The results support the theoretical predictions. During U.S. election years, increased unemployment substantially lowers the risk of a WTO dispute.[58] From Model 1, during an election year, an increase in unemployment from 3% to 7% decreases the risk of a WTO dispute for any particular month by approximately 84%.[59] When unemployment is high, and as a result, pressure in the U.S. to lower tariffs in the face of a WTO dispute is correspondingly low, potential plaintiffs are less inclined to initiate disputes against the United States. The lack of pressure for compliance, or even the potential of triggering a backlash against the foreign trading partner and "the meddlesome WTO," make disputes less promising for potential plaintiffs. Conversely, during non-election years, increased unemployment is weakly associated with a higher risk of a WTO dispute. This is consistent with plaintiffs waiting until non-election years to initiate WTO disputes. If the plaintiff knows that the U.S. is in an election year, and is more hostile to free trade because of tough economic times, they are more willing to delay their WTO disputes until less politically sensitive times.

Other theories receive mixed support. For retaliation, increased U.S. exports to the plaintiff

[57] I used the *coxph* program in the Zelig package for R (Lam, 2007), using robust standard errors and the Breslow tie-breaking method. I do not extensively analyze alternative tie-breaking methods or the proportional hazards assumption since they are not issues in the preferred MNP models considered extensively below.

[58] Recall that the "total" effect of unemployment accounts for the coefficient on the interaction term and the constituent terms. For example, the "total" coefficient for unemployment during an election year in Model 1 is $-5.44 + 0.088 = -0.456$.

[59] Holding other variables at their sample means and with plaintiff election set to 1.

are associated with a higher risk of a WTO dispute as predicted. But increased imports from the plaintiff, i.e. weakened plaintiff leverage, are also weakly associated with a higher risk of a WTO dispute. Tariffs against richer plaintiffs have a weakly higher risk of WTO disputes. Explanations based on plaintiff unemployment and electoral dynamics receive little support.

4.5.2 Results: Competing Risks

What are the effects of the explanatory variables when accounting for the competing risks of *WTO Dispute* and *Unilateral Removal*? Table 2 reports summary statistics of the posterior densities for the coefficients in the MNP specifications.[60] The top half reports the coefficients for the effect of the covariates on the probability of a *WTO Dispute* relative to the probability that a tariff remains *In Effect*. The bottom half reports the coefficients for the effect of the covariates on the probability of a *Unilateral Removal* relative to the probability that a tariff remains *In Effect*. A positive coefficient means that an increase in that covariate increases the probability of that event, relative to the base category. I report the mean and 95 $\%$ confidence bands associated with each covariate's posterior density. To (greatly) ease interpretation, I focus on the substantive effects of the variables of interest on the probability of a *WTO Dispute* and *Unilateral Removal*.

First, Figure 4 shows the effects of *U.S. Unemployment*, broken down by *U.S. Election Year*, on the probability of a *WTO Dispute*.[61] The pattern predicted by the theory and that found in the Cox regressions again is apparent. During election years, higher unemployment decreases the probability of a WTO dispute. Other countries are less likely to initiate WTO disputes against the U.S.

[60] I use the same progression of models as in the Cox results, but in models with calendar month trends, I also add a quadratic age polynomial. The *Age* variable is a counter that begins at 1 for the first month that a tariff is *In Effect*. I also include *Age* squared. This approximates the baseline hazard in the Cox approach.

[61] For these figures, I drew $\sim$ 1,000 draws from the posteriors of each coefficient, using Model 7, and calculated the probabilities based on a matrix with the other covariates set to their sample means (and plaintiff election set to 1), generating predictions from each posterior draw. The Figures show the means of these predictions. I varied *U.S. Unemployment* from 4.5 to 5.7, which are the sample 25th and 75th percentiles. I choose these bounds to avoid extrapolating too far into the tails of the sample. In subsequent figures, I again use the sample 25^{th} and 75^{th} percentiles of the relevant variables. The vertical axes are the predicted probabilities *for a single month-long interval*, which is why the scale of these axes is small. See text for aggregated substantive effects.

during politically sensitive times when broader audiences are more supportive of protectionism. Conversely, higher unemployment increases the probability of a dispute during non-election years. During times of high unemployment, other countries delay their WTO disputes until policymakers are less constrained by protectionist pressures. During an election year with 4.6% unemployment, a tariff is approximately *four times* as likely to experience a WTO dispute than during an election year with 5.7% unemployment.[62] The risk of a WTO dispute is approximately 0.5% in a high-unemployment election year and 2.1% in low-unemployment election years- a substantial increase when considering the relative infrequency of WTO disputes.

Second, Figure 5 shows the effects of *U.S. Unemployment*, broken down by *U.S. Election Year*, on the probability of *Unilateral Removal*. The inter-electoral dynamics associated with WTO disputes are *not* present for *Unilateral Removal*. During times of higher unemployment, the U.S. is less likely to unilaterally remove its tariff barriers, regardless of electoral dynamics. This is consistent with Hansen (1990) who finds that higher industry-level unemployment increases the probability of affirmative ITC rulings. Firms are more successful at winning and keeping protectionist tariffs through AD and CVD petitions when times are bad.

This finding is also an informal placebo test of theory. We would not expect the political-economic effects of unemployment and electoral dynamics that affect the probability of a WTO dispute to also affect the decisions of bureaucrats who are making decisions over unilateral removal. Bureaucracies are not elected officials making decisions in the shadow of a possible backlash from a broad constituency. While bureaucratic agents are influenced political agents who control their purse strings, e.g. the chair of the House Ways and Means Committee, those principals are beholden to more narrow constituent interests. It is encouraging for the theory that inter-electoral dynamics are present only for *WTO Disputes*, and not for *Unilateral Removal*.

Further support comes analyzing the relationship between the number of AD and CVD petitions filed and the overall U.S. unemployment rate. Of course, the occurrence of petitions and

[62] These estimates come from compounding the risk over a 12-month election-year timespan.

WTO disputes is "not random." As in the discussion of 10, we would be worried if there was strong evidence that firms or the bureaucracies making decisions over AD and CVD petitions anticipated possible WTO disputes, potentially biasing the above findings because of correlation between "unobservables" that influence petitioning decisions and unemployment/elections. If firms filed fewer petitions in times of low unemployment and more petitions in times of higher unemployment, then that would be evidence that they possibly anticipated future WTO disputes, and resulting pro-free trade audience support.

Figure 6 plots the number of new AD and CVD petitions against the U.S. unemployment rate. Fortunately, we do not find evidence of anticipatory behavior. There are not more petitions filed during times of higher unemployment.[63] This is not surprising. When deciding to file a petition, firms focus on their own situation, not overall economic conditions. Bown (2005) jointly models the decision over whether to file a petition *and* whether a WTO dispute results. He does not find substantively different results from models that do and do not account for the first stage, or selection decision- to file a petition. WTO disputes are also relatively infrequent, and they are often greatly delayed when they do occur, which makes it unlikely that possible WTO disputes are dominant factors in petitioning decisions.

Third, Figure 7 and Figure 8 show the effects of U.S. exports and imports on the probability of a *WTO Dispute* and *Unilateral Removal*.[64] As the U.S. exports more to the country targeted by a tariff, the country is more likely to initiate a WTO dispute. Larger countries and countries to whom the U.S. exports more have greater leverage over the United States, and are therefore better able to compel the United States to comply with adverse WTO rulings. The U.S. is also more likely to unilaterally remove protectionist barriers against these countries. The United States is more restrained overall in its tariffs towards larger partners.

The opposite is true of U.S. imports. As the U.S. imports more from a particular country, that

[63]This result is similar if I break the Figure down by election year verses non-election years.

[64]These predictions set the all other covariates to their sample means, with *U.S. Election Year* set to 1. The lines represent the mean of the predictions associated with 300 draws from the posterior coefficient densities.

country is less likely to initiate WTO disputes against the United States. They have less leverage over the U.S. even if they were to win a WTO ruling, because of the fear of counter-retaliation. The U.S. is also less likely to unilaterally remove protectionist barriers. This is consistent with existing work that finds that import surges and import penetration are an important impetus for petitions[65]

5 Conclusions

This paper developed a theory in which institutional alarms mobilize domestic audiences to impose noncompliance costs. The theory incorporated variation in the preferences and strength of domestic audiences and also the endogenous decision made by member states to use an institution to transmit information. I showed the conditions under which often-referenced dynamics arise endogenously. For existing theories based on credible commitments or audience cost, which generally do not incorporate these features, there is good news and bad news. The good news is that institutions can generate these costs vis-a-vis domestic audiences under very minimal restrictions. The institution need only provide a costly way for a foreign government to signal to uninformed domestic audiences that a government has misbehaved. Dispute settlement bodies provide such a forum since their use is both costly and public. When the preferences of the alarm-sounding government and the relevant domestic audience are sufficiently aligned, such a mechanism can help the home audience better deter its government from choosing policies that are at odds with its international obligations, even when disputes do not occur. Evaluating whether applications of credible commitments or audience costs theories meet these conditions in certain contexts or with regards to particular issue areas should be *a priori* to applying those explanations for observed behavior.

Additionally, the bad news is that these conditions show important limitations on the degree to which the informational role of institutions can create noncompliance costs. Even when the

[65]Busch, Reinhardt and Shaffer (2009); Allee (N.d.).

necessary conditions for noncompliance costs to arise endogenously are met, the magnitude of these costs is constrained by the preferences and political strength of the audience in question. The institution cannot take compliance further than the audience is willing to go. At one extreme, when the audience supports noncompliance, providing them information about their government's decision can potentially create incentives to decrease compliance further. Less extreme, though still troubling from the perspective of international cooperation, is the fact that audiences who only weakly prefer compliance or who are politically ineffectual do not generate significant noncompliance costs, and therefore do not constrain their government from misbehaving. Institutions, even when they provide important informational fora, cannot get blood from a stone, i.e. they induce cooperation where it is not domestically supported.

I also derived predictions linking audience preferences and strength that shed light on a puzzling empirical phenomenon: the significant variation in the timing of international disputes. Using data on U.S. tariffs and subsequent trade disputes, I showed that the timing of these disputes is consistent with the model's conditional hypothesis: disputes are least likely when the government is sensitive to broader audiences who support protectionism. During presidential election years with high unemployment, other countries delay targeting the United States with trade disputes, and are more likely to initiate those disputes during election years with lower unemployment. In addition to providing empirical support for the theory, the empirical analysis also explained substantively important variation. To turn a well known phrase, trade cooperation delayed is trade cooperation denied. Understanding the timing of these disputes is as important as understanding their occurrence. While the empirical analysis necessarily considered proxies for "broader" audiences- such as presidential election years and macroeconomic indicators like unemployment- future research into the preferences and political strength of specific audiences, i.e. at the firm level or interest-group level, represents a promising way to further explore these questions.

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Appendix 1: Theoretical Model

Proposition 6. *A CCE exists if and only if:*

(i) $Pr(H = B| \sim D)[u_A(t^*_{2b}) - u_A(t^*_{1b})] \leq m \leq Pr(H = B|D)[u_A(t^*_{2b}) - u_A(t^*_{1b})]$

(ii) $Pr(H = B|D) > Pr(H = B| \sim D) > 0$.

Proof of Proposition 6: Existence of Credible Commitments Equilibrium. Where necessary, I index the optimal initial and final policies chosen by bad governments with the subscript b: t^*_{1b} and t^*_{2b}. For good governments, I use the subscript g. Where there is no need to distinguish between government types, I omit the subscripts.

For the audience to choose $M|D$, it must be the case that $EU_A(M)|D \geq EU_A(\sim M)|D$. Rewriting the audience's expected utilities:

$$Pr(H = A|D)u_A(A) + Pr(H = B|D)u_A(t^*_{2b}) - m \geq Pr(H = A|D)u_A(A) + Pr(H = B|D)u_A(t^*_{1b})$$

$$m \leq Pr(H = B|D)[u_A(t^*_{2b}) - u_A(t^*_{1b})]$$

where $Pr(H = B|D) = \frac{\lambda F(t^*_{1b} - t^*_{2b})}{\lambda F(t^*_{1b} - t^*_{2b}) + (1-\lambda)F(0)}$.

For the audience to choose $\sim M| \sim D$, it must be the case that $EU_A(\sim M)| \sim D \geq EU_A(M)| \sim D$. As above, the audience's expected utilities are:

$$Pr(H = A| \sim D)u_A(A) + Pr(H = B| \sim D)u_A(t^*_{1b}) \geq Pr(H = A| \sim D)u_A(A) + Pr(H = B| \sim D)u_A(t^*_{2b}) - m$$

$$m \geq Pr(H = B| \sim D)[u_A(t^*_{2b}) - u_A(t^*_{1b})]$$

where $Pr(H = B| \sim D) = \frac{\lambda[1-F(t^*_{1b} - t^*_{2b})]}{\lambda[1-F(t^*_{1b} - t^*_{2b})] + (1-\lambda)[1-F(0)]}$.

Derivations of t^*_{1b} and t^*_{2b}, as well as optimal policies chosen by good governments and dispute probabilities are shown in the proofs for subsequent propositions. □

Proposition 7. *The optimal post-mobilization policy, t^*_2 satisfies: $\frac{\alpha}{1-\alpha} = \frac{u'_H(t^*_2)}{-u'_A(t^*_2)}$.*

Corrollary 2. *In equilibrium:*
(i) $\frac{\partial t^*_2}{\partial A} > 0$, (ii) $\frac{\partial t^*_2}{\partial \alpha} < 0$, and (iii) $\frac{\partial t^*_2}{\partial B} > 0$, for bad home governments.

Proof of Proposition 7: Optimal Post-mobilization policy. After mobilization, the home government faces the following optimization problem:

$$max_{t_2} \ \alpha u_A(t_2) + (1 - \alpha)u_H(t_2)$$

The proof follows from rearranging the first order conditions of the post-mobilization maximization problem, $\alpha u'_A(t^*_2) + (1 - \alpha)u'_H(t^*_2) = 0$.

The ratio of the audience and home government's marginal utilities matches the (inverse) ratio of their strength after mobilization. If the home government and audience's utility functions, u_H

and u_A, were identical apart from their maximization points and were symmetrical, then the optimal policy would be an α-weighted combination of the two ideal points, $t_2^* = \alpha A + (1-\alpha)H$. For instance, this would be the case if both the home government and audience held preferences represented by the often-used quadratic loss function. If the audience and the home government share the same ideal point, $A = H$, as in the case of a "good" government, then $t_2^* = A$. □

Proposition 8. *For a fixed initial tariff, t_1, and, when $H > A$, the probability of a dispute, $\Pi(t_1)$, is: (i) decreasing in A, (ii) increasing in α, and (iii) decreasing in H.*

Proposition 9. *The home government's optimal initial policy, t_1^*, is: (i) increasing in A, (ii) decreasing in α, and (iii) increasing in H.*

Proof of Proposition 9 and 8: Probability of a Dispute and Optimal Initial Policy. Before describing optimal initial policy, I describe the probability of a dispute. The utility to the foreign government of initiating a dispute is $-t_2^* - k$, and the utility of not doing so is $-t_1$. In a CCE, the foreign government initiates a dispute if and only if their costs are lower than their expected gains:

$$k \leq t_1 - t_2^*$$

Recall, for a good home government, $t_{2g}^* = A$, and for a bad home government, $t_{2b}^* > A$. For a good home government, therefore, the foreign government only initiates a dispute if it draws a negative litigation costs, i.e. it has some extraneous benefit to initiating a dispute, apart from the potential effects on home's policies. Facing a bad home government, the benefit of a dispute comes from the effect that any subsequent audience mobilization will have on changing the initial tariff policy to a new, lower final policy. If the foreign government draws a litigation cost that is higher than the benefits from changing the home government's policy, then it will not initiate a dispute. The probability of a dispute for a particular initial policy, which I call $\Pi(t_1)$, is the probability that the foreign government draws a low enough litigation cost that it will choose to initiate a dispute.

$$\Pi(t_1) = Pr(k \leq t_1 - t_2^*) = F(t_1 - t_2^*)$$

The home government's initial optimization problem and related first order condition are:

$$max_{t_1} \quad \Pi(t_1)u_H(t_2^*) + (1 - \Pi(t_1))u_H(t_1)$$

$$max_{t_1} \quad F(t_1 - t_2^*)u_H(t_2^*) + (1 - F(t_1 - t_2^*))u_H(t_1)$$

$$[1 - F(t_1^* - t_2^*)]u_H'(t_1^*) = f(t_1^* - t_2^*)[u_H(t_1^*) - u_H(t_2^*)]$$

For a good home government, their optimal policy choice is $t_{1g}^* = A$. Good home governments can do no better by choosing a different initial policy. If the foreign government draws a negative litigation cost and initiates a dispute, then the good home government will still choose $t_{2g}^* = A$. If the foreign government draws a higher litigation cost, they will not initiate a dispute and the audience will not mobilize, leaving the home government's ideal policy in place.

Observe that for bad governments, $t_{1b}^* \in [t_{2b}^*, B]$. The home government can do no better by choosing an initial policy higher than B, such that $t_{1b} > B$. Lowering the policy to B decreases the probability of a dispute and leaves the home government better off if they avoid a dispute. Similarly, the home government can do no better by choosing a policy lower than t_{2b}^*, such that $t_{1b} < t_{2b}^*$. Raising the policy to t_{2b}^* lowers the probability of a dispute by decreasing the distance between t_1^* and t_2^* and leaves the home government better off if they avoid a dispute.

Rewriting the FOC for the home government's maximization problem associated with t_1^* yields:

$$f(t_1^* - t_2^*)[u_H(t_2^*) - u_H(t_1^*)] + [1 - F(t_1^* - t_2^*)]u_H'(t_1^*) = 0$$

Since t_2^* is uninfluenced by t_1^*, we can rewrite the FOC as:

$$h(t_1^*)\frac{\partial t_1^*}{\partial t_2^*} + g(t_2^*) = 0$$

where $h(t_1^*)$ is the total derivative of the FOC with respect to t_1^* and $g(t_2^*)$ is the total derivative of the FOC with respect to t_2^*.

Rearranging yields:

$$\frac{\partial t_1^*}{\partial t_2^*} = \frac{-g(t_2^*)}{h(t_1^*)}$$

Substituting in the total derivatives, $h(t_1^*)$ and $g(t_2^*)$ yields:

$$\frac{\partial t_1^*}{\partial t_2^*} = \frac{f'(t_1^* - t_2^*)[u_H(t_2^*) - u_H(t_1^*)] - f(t_1^* - t_2^*)[u'_H(t_2^*) + u'_H(t_1^*)]}{f'(t_1^* - t_2^*)[u_H(t_2^*) - u_H(t_1^*)] - 2f(t_1^* - t_2^*)u'(t_1^*) + [1 - F(t_1^* - t_2^*)]u''_H(t_1^*)}$$

Since $f'(k) = 0$ for the uniform distribution, this equation can be signed by observing that $u'_H > 0$ and $u''_H < 0$ for all $t \in [A, B]$. It follows that $\frac{\partial t_1^*}{\partial t_2^*} \geq 0$. This implies that t_1^* "inherits" the properties of t_2^* that are described in Corollary 2. □

Proposition 10. *If* $f(t_1^* - t_2^*)u'_H(t_2^*) \leq -[1 - F(t_1^* - t_2^*)]u''_H(t_1^*)$ *then* $\frac{\partial \Pi(t_1^*)}{\partial A} \geq 0$ *and* $\frac{\partial \Pi(t_1^*)}{\partial \alpha} \leq 0$

Proof of Proposition 10: Audience Effects on Optimal Initial Policy. This proof builds off of the proof for Proposition 9 which showed that $\frac{\partial t_1^*}{\partial t_2^*} \geq 0$. Now, we consider whether $\frac{\partial t_1^*}{\partial t_2^*} \leq 1$. If $\frac{\partial t_1^*}{\partial t_2^*} \leq 1$, then equilibrium increases in t_2^* result in *smaller* accompanying increases in t_1^*. Since k is distributed uniformly, this would imply that the post-dispute effect dominates.

Recall the expression for $\frac{\partial t_1^*}{\partial t_2^*}$ with the uniform distribution simplifies to:

$$\frac{\partial t_1^*}{\partial t_2^*} = \frac{f(t_1^* - t_2^*)[u'_H(t_2^*) + u'_H(t_1^*)]}{2f(t_1^* - t_2^*)u'(t_1^*) - [1 - F(t_1^* - t_2^*)]u''_H(t_1^*)}$$

Since Proposition 9 implies that the numerator and denominator have the same sign, for $\frac{\partial t_1^*}{\partial t_2^*} \leq 1$ it must be the case that:

$$f(t_1^* - t_2^*)[u'_H(t_2^*) + u'_H(t_1^*)] \leq 2f(t_1^* - t_2^*)u'(t_1^*) - [1 - F(t_1^* - t_2^*)]u''_H(t_1^*)$$

$$f(t_1^* - t_2^*)u'(t_2^*) \leq -[1 - F(t_1^* - t_2^*)u''(t_2^*)$$

yielding the condition stated in Proposition 10.

□

Appendix 2: Empirical Model

Following Imai and VanDyk (2005), I let the observed multinomial variable, Y_{it}, take on a distinct value depending on the status of tariff i at time t. Let $j = 1, 2, 3$ index the 3 statuses, *WTO Dispute, Unilateral Removal, In Effect*. Call $j = 3$, *In Effect*, the base category. Let $W_{it} = (W_{it1}, W_{it2})$ be a vector of 2 latent variables, associated with *WTO Dispute* and *Unilateral Removal*, for tariff i at time t. The observed variable, Y_{it} is modeled in terms of W_{itj} via:

$$Y_{it}(W_{itj}) = \begin{cases} 0 & \text{if } max(W_{it}) < 0 \\ j & \text{if } max(W_{it}) = W_{itj} > 0 \end{cases}$$

where $max(W_{it})$ represents the largest value in the vector W_{it}. The latent variables are modeled as a function of the k observed covariates.

$$W_{it} = X_{it}\beta + e_{it}, e_{it} \sim N(0, \Sigma)$$

X_{it} is a $2 \times k$ matrix of observed covariates and β is a $k \times 1$ vector of coefficients. $\Sigma = (\sigma_{lm})$ is a positive definite 2×2 matrix. For identification, the model assumes that $\sigma_{11} = 1$. The Bayesian approach implemented here uses the MCMC procedure developed by Imai and VanDyk (2005) to sample to sample from posterior distributions of β and Σ, based on particular prior distributions. I use very agnostic priors, where each element of β is distributed normally with mean 0 and variance

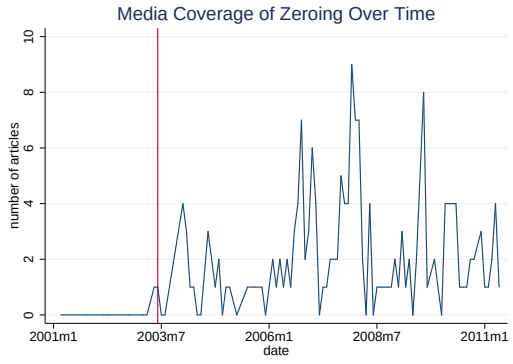
100.[66] For the main MNP model, I used a burn-in of 20,000 draws and kept every fourth draw from 70,000 subsequent draws.[67]

[66] Setting the prior variance to 100 means that the prior distribution is very diffuse and unlikely to influence results.

[67] For the models with calendar month and age polynomials included as covariates (described below), I set the prior variance to 80, used a 15,000 draw burn-in, and kept every fourth draw from 60,000 subsequent draws.

Figures

Figure 1: Amount of U.S. Media Coverage of Zeroing Over Time



Number of articles mentioning zeroing over time. The search used the terms were "united states and dumping and zeroin! and commerce" in Lexis Nexis Academic Universe, in U.S. Newspapers and Wires and Major Newspapers. Search conducted on 10/05/10. Hits were checked for appropriate content.

Figure 2: Paths Along Lifespan of AD/CVD Petitions

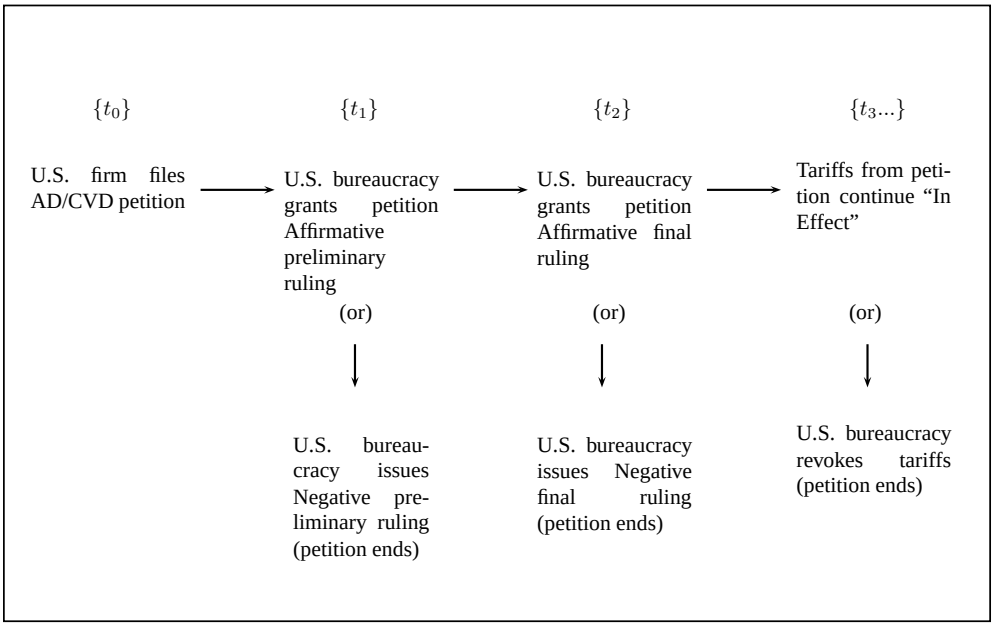


Figure 3: Distribution of Number of Months from Tariff Initiation to WTO Dispute

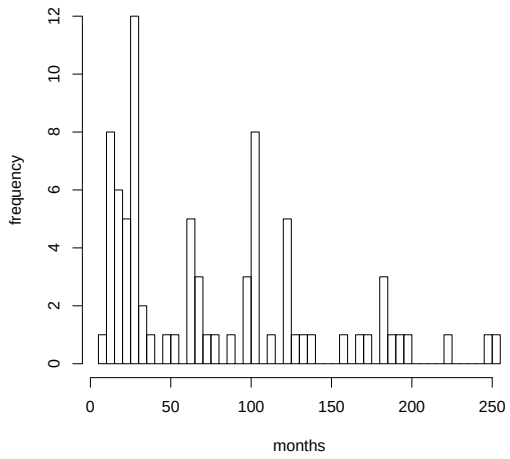
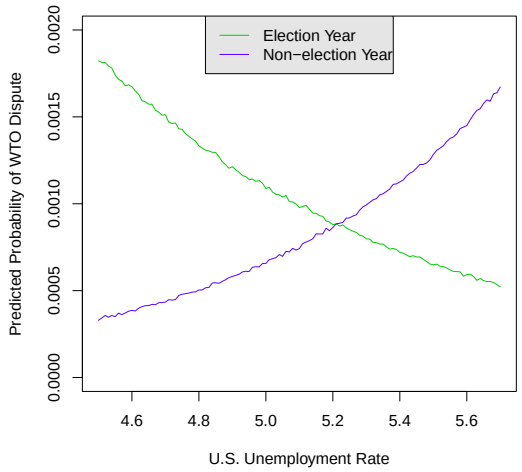


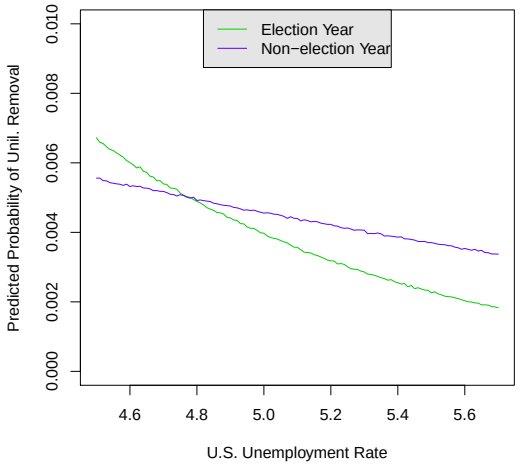
Figure shows distribution of the number of months elapsing in between an affirmative preliminary ruling and a WTO dispute targeting the tariffs associated with that petition. Sample is identical to that used in empirical analysis, consisting of AD and CVD petitions initiated by U.S. firms against trading partners who were WTO members, covering 1995-2009.

Figure 4: Effect of Unemployment on Probability of WTO Dispute, by Election Year



Mean of distribution calculated from samples from posterior distribution of coefficients. Figure uses the posterior parameter distributions from Model 7. The values of U.S. unemployment range from the sample 25^{th} to 75^{th} percentiles. For an unemployment level u and associated probability of dispute $p(u)$, the risk of a WTO dispute for an election year equals $1 - p(u)^{12}$. Other covariates are set to their sample means, with Plaintiff Election set to 1.

Figure 5: Effect of Unemployment on Probability of Unilateral Removal, by Election Year



Mean of distribution calculated from samples from posterior distribution of coefficients. Figure uses the posterior parameter distributions from Model 7. The values of U.S. unemployment range from the sample 25^{th} to 75^{th} percentiles. Other covariates are set to their sample means, with Plaintiff Election set to 1.

Figure 6: Number of Petitions Receiving Preliminary Approval verses U.S. Unemployment Rate, 1995-2009 (Monthly)

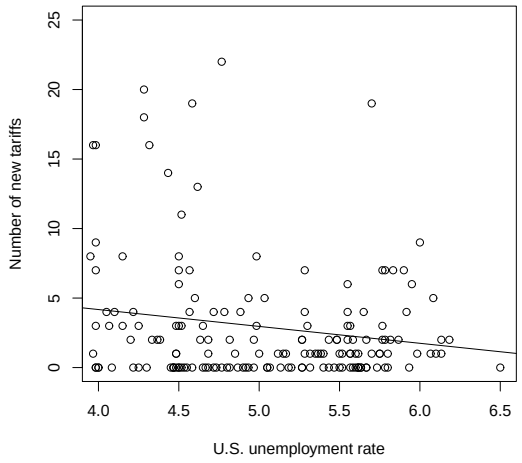
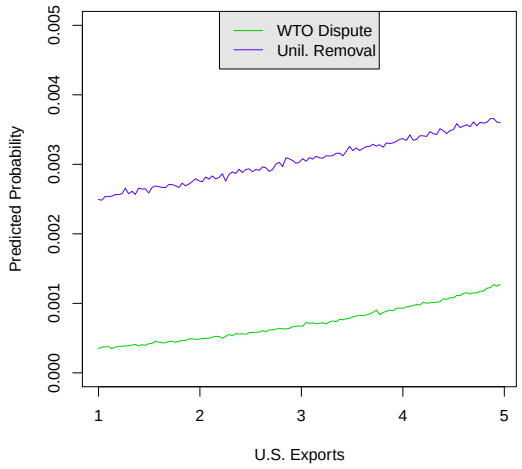


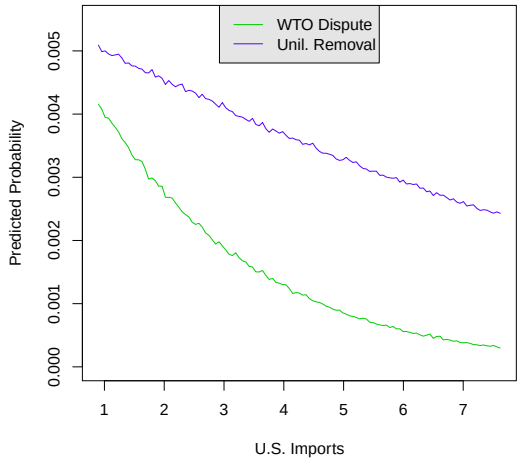
Figure plots the number of petitions receiving their preliminary approval in a particular month verses the 6 month moving average of the U.S. unemployment rate for that month. Fit line is from bivariate linear regression of number of approvals on unemployment.

Figure 7: Effect of U.S. Exports on Probability of WTO Dispute and Unilateral Removal



Mean of distribution calculated from samples from posterior distribution of coefficients. Figure uses the posterior parameter distributions from Model 7. The values on the horizontal axis represent the percent of U.S. exports going to the country targeted by the tariff, and the values range from the sample 25^{th} to 75^{th} percentiles. Other covariates are set to their sample means, with Plaintiff Election set to 1.

Figure 8: Effect of U.S. Exports on Probability of WTO Dispute and Unilateral Removal



Mean of distribution calculated from samples from posterior distribution of coefficients. Figure uses the posterior parameter distributions from Model 7. The values on the horizontal axis represent the percent of U.S. imports coming from the country targeted by the tariff, and the values range from the sample 25^{th} to 75^{th} percentiles. Other covariates are set to their sample means, with Plaintiff Election set to 1.

Tables

Table 1: Cox Models: Risk of WTO Dispute

	Model 1	Model 2	Model 3	Model 4
U.S. Elec. Yr. * U.E.	-0.544*	-1.978***	-0.521*	-1.394**
	(0.322)	(0.588)	(0.295)	(0.454)
U.S. Unemployment	0.088	1.025**	0.063	0.678*
	(0.127)	(0.367)	(0.162)	(0.319)
U.S. Elec. Yr.	3.237*	10.278***	3.251*	7.469***
	(1.587)	(2.960)	(1.502)	(2.364)
U.S. Exports	0.018	0.280***	0.025	0.267***
	(0.045)	(0.068)	(0.035)	(0.073)
U.S. Imports	0.009	-0.348***	0.011	-0.336***
	(0.038)	(0.075)	(0.031)	(0.087)
Pl. PCGDP		$5.41\text{x}10^{-5}$***		0.000***
		($1.35\text{x}10^{-5}$)		(0.000)
Pl. Elec. Yr. * U.E.		-0.006		-0.003
		(0.066)		(0.066)
Pl. Unemployment		-0.027		-0.021
		(0.033)		(0.031)
Pl. Elec. Yr.		0.341		0.297
		(0.518)		(0.544)
Month			0.071***	0.074***
			(0.016)	(0.021)
Month Sq.			$-3.04\text{x}10^{-4}$***	$-3.56\text{x}10^{-4}$***
			($7.84\text{x}10^{-5}$)	($1.15\text{x}10^{-4}$)
Log-likelihood	-404.609	-235.620	-386.981	-226.487
Num. Tariff	574	437	574	437
Num. Disputes	78	52	78	52

Coefficient estimates from Cox proportional hazards model with robust standard errors. *WTO Dispute* is the failure event, with *Unil. Remov.* treated as right-censoring.

Table 2: MNP Models: Risk of WTO Dispute

	Model 5	Model 6	Model 7	Model 8
		WTO Dispute		
U.S. Elec. Yr. * U.E.	-0.253	-0.973	-0.300	-0.785
	(-0.438, -0.067)	(-1.365, -0.606)	(-0.562, -0.043)	(-1.206, -0.392)
U.S. Unemployment	0.048	0.517	0.046	0.431
	(-0.048, 0.143)	(0.263, 0.813)	(-0.105, 0.176)	(0.135, 0.751)
U.S. Elec. Yr.	1.416	5.049	1.720	4.143
	(0.463, 2.332)	(3.186, 7.056)	(0.377, 3.026)	(2.163, 6.262)
U.S. Exports	-0.001	0.135	0.010	0.135
	(-0.027, 0.023)	(0.069, 0.212)	(-0.020, 0.043)	(0.073, 0.206)
U.S. Imports	-0.017	-0.167e	0.003	-0.169
	(-0.034, -0.002)	(-0.259, -0.086)	(-0.027, 0.031)	(-0.255, -0.093)
Pl. PCGDP		2.216×10^{-5}		2.277×10^{-5}
		(1.013×10^{-5}, 0.000)		(1.074×10^{-5}, 0.000)
Pl. Elec. Yr. * U.E.		-0.007		-0.005
		(-0.069, 0.053)		(-0.076, 0.059)
Pl. Unemployment		-0.014		-0.014
		(-0.054, 0.024)		(-0.062, 0.024)
Pl. Elec. Yr.		0.191		0.162
		(-0.303, 0.680)		(-0.365, 0.693)
Intercept	-3.216	-6.974	-5.009	-7.841
	(-3.958, -2.537)	(-8.689, -5.383)	(-6.120, -2.851)	(-9.867, -6.156)
		Unilateral Removal		
U.S. Elec. Yr. * U.E.	-0.240	-0.072	-0.142	-0.025
	(-0.368, -0.120)	(-0.224, -0.007)	(-0.423, -0.051)	(-0.121, -0.001)
U.S. Unemployment	-0.126	-0.033	-0.089	-0.016
	(-0.198, -0.058)	(-0.122, -0.003)	(-0.173, -0.036)	(-0.073, -0.001)
U.S. Elec. Yr.	1.168	0.3460	0.688	0.118
	(0.592, 1.782)	(0.032, 1.092)	(0.250, 2.032)	(0.007, 0.577)
U.S. Exports	0.021	0.010	0.015	0.003
	(0.005, 0.038)	(8.909×10^{-4}, 0.034)	(0.004, 0.039)	(6.982×10^{-5}, 0.017)
U.S. Imports	-0.017	-0.012	-0.011	-0.003
	(-0.034, -0.002)	(-0.039, -0.001)	(-0.031, -0.002)	(-0.019, 0.000)
Pl. PCGDP		3.202×10^{-06}		1.104×10^{-6}
		(3.955×10^{-07}, 0.000)		(8.808×10^{-8}, 0.000)
Pl. Elec. Yr. * U.E.		-0.007		-0.002
		(-0.025, 0.000)		(-0.001, 0.000)
Pl. Unemployment		0.002		8.103×10^{-4}
		(-8.424×10^{-4}, 0.011)		(-3.260×10^{-4}, 0.005)
Pl. Elec. Yr.		0.065		0.020
		(0.005, 0.230)		(-9.952×10^{-5}, 0.107)
Intercept	-1.694	-0.566	-0.955	-0.201
	(-2.110, -1.300)	(-1.547, -0.081)	(-2.214, -0.512)	(-0.896, -0.019)
Calendar Month Trends	N	N	Y	Y
Age Trends	N	N	Y	Y
Num. Tariff	574	437	574	437
Num. WTO Disputes	78	52	78	52
Num. Unil. Remov.	318	261	318	261

Mean of posterior density for each covariate, for *WTO Dispute* and *Unil. Removal*, with 95% confidence bands.

Base category is *In Effect*.