

# A strategic statistical model of the escalation of trade disputes at the WTO

**Sven Van Kerckhoven**



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## **Abstract**

This paper presents a strategic statistical model of the World Trade Organization's Dispute Settlement, with a special focus on developing countries. The WTO Dispute Settlement Understanding (WTO DSU) allows WTO members to enforce the trade liberalization commitments made by other WTO members over the different trade liberalization rounds. The WTO DSU has been put forwards as a means to level the playfield between developing and developed WTO member states. This paper empirically studies whether developing countries still settle for less beneficial outcomes, and whether this type of countries use the WTO litigation process to the same extent as their developed counterparts. We empirically estimate the determinants of the decisions of developing and developed countries within the WTO dispute settlement structure. We allow for forward-looking governments, that take into account their expectations regarding the actions of the other party in the dispute.

# 1. Introduction

Countries are affected by the trade policies of other countries. Increased economic globalization has only strengthened this evolution. The trade interdependence of countries can lead to conflicts and disputes.

The WTO provides a solution for the settlement of trade conflicts. Members to this organization have made binding commitments over trade policies and have liberalized their trade over several trade rounds. Conflicts over the implementation and the consistency of trade policies occur, and at such instances, the countries involved discuss and negotiate over the trade policy at hand. When these negotiations fail, the contested trade policy can be brought before the WTO which then revises the trade policy. When the WTO was established in 1994, as successor to the GATT, the WTO DSU was annexed to the WTO agreements. This WTO DSU delineates the process of litigation of trade policies at the WTO.

Over the last two decades, WTO members have made intensive use of the WTO DSU. About 500 cases have so far been investigated by specialized WTO panels. These have resulted in a variety of outcomes, as the process of WTO litigation allows parties to settle a dispute and thus stop the litigation process at given times. Parties to a dispute can for example at all times find a common solution which would herald the end of the litigation process. However, some disputes escalate and result in heightened conflict when one of the parties decides to involve WTO panels, or when the defendant decides against implementing the panel's recommendations.

Clearly filing a complaint at the WTO already bears signs of the escalation of a trade dispute. Generally, trade disputes are solved during bilateral talks. Seeking involvement of the WTO is often already a last means to push for the removal of the trade barrier in question. However, when consultations fail (the first step of WTO litigation), the dispute can escalate further. As with a recent string of complaints against Argentina,<sup>i</sup> the request for WTO panels often goes hand in hand with heightened tensions and frustrations. At the same time, it is clear that settling earlier in the WTO's dispute game might not enable countries to fully realize the benefits they might have realized by sitting out the full ride.

In this paper, we study the escalation of trade disputes within the WTO DSU. We analyze the first 426 trade disputes at the WTO. We pay particular attention to developing countries, as these have been found to face additional challenges in navigating the WTO DSU. Additionally, we investigate the effect of

several other variables. We use statistical backwards induction and show that developing countries indeed make different decisions within the WTO at the two main escalation phases. Moreover, we find evidence that a variety of other measures also influence the decisions taken by parties within the WTO DSU.

The next section provides an overview of the relevant academic literature and position the paper therein. The third section elaborates on our basic set-up. Section four presents the game-theoretic model of the WTO's dispute settlement, and lays down our strategic statistical approach. The results of the latter are discussed in the fifth section. Section six looks deeper into the actions taken by developing countries in the WTO DSU. We conclude in section seven.

## **2. Literature review**

The WTO and its DSU have received ample scholarly attention over the last years. Scholars, observers and practitioners studied the WTO's DSU from economic, legal and political points of view. The result is an impressive body of work covering many of the question regarding the functioning of the WTO's DSU. Only a handful studies have dealt with the escalation of trade disputes. The question why some disputes are not settled during the consultations phase, and why some disputes end up in CVMs remains largely unaddressed. This is all the more puzzling when one takes into account that the WTO itself pushes countries to either settle during the initial consultation phase, or during the implementation phase.

Guzman and Simmons (2002) examine which kind of disputes tend to escalate to a panel phase. They explain that in cases where no side payments are possible, or when the disputed policy is discontinuous (meaning that there is less incremental policy adoption room), the dispute is more likely to end up with panel involvement.

Focusing more on the costs of a dispute than the policy maneuver room, Busch and Reinhardt (2000) find that escalation should be exceptional as the parties to a dispute stand to gain more from early settlement. Settling early is more likely to induce the policy concessions desired by the plaintiff. They show that the anticipation, rather than the realization, of a ruling boosts the bargaining possibilities, leading to a mutual beneficial settlement compared to a panel ruling. Reinhardt (2001) builds an incomplete information model, and argues along the same line. His results are driven by the uncertainty of the defendant regarding the panel ruling.

Van Kerckhoven and Crombez (2015) study the impact of the cost of litigation. In that paper, we find that disputes are only initiated when the plaintiff is rather certain of a violation. Moreover, the parties can settle a dispute before panels are established at more favorable terms. Consequently, escalation can be explained by political motives, rather than economic cost-benefit analysis. A dispute only escalates when the parties are unwilling to draft a reasonable settlement offer and are willing to bear the costs of escalation at the different escalation phases.

In a recent paper, Yildirim and De Bièvre (2015) look into the determinants of the escalation of WTO disputes in which a developing country initiates a case against the EU. They identify two escalation phases similar to the ones employed in this paper. They find that the EU's behavior in these escalation phases is driven by the presence of third parties (who follow the dispute settlement proceedings) and trade dependency and that the EU's reaction does not depend on the state of development of the party initiating the dispute.

Some other papers have studied the functioning of, and the challenges faced by, developing countries in the WTO. Two main issues have been identified. The first issue is related to the initial step to file a complaint at the WTO. Developing countries might lack sufficient resources to monitor and recognize possible WTO violations. Most of the developing countries might not be able to recognize litigation opportunities. Van Kerckhoven and Crombez (2015b) study the government-industry interaction that might lead to WTO litigation. This paper demonstrates that without an industry advocating a WTO complaint, less complaints will be filed as it is hence up to the government to identify potential WTO-inconsistent trade barriers. Governments of developing countries typically lack the information and staff to identify these. Busch and Reinhardt (2003b) argue that the private information of the players, whereby a poorer WTO member typically has less access to information, makes developing countries lose out even before panels are established. Moreover, most of them have no permanent Geneva-based delegation to keep them up to date of the daily work at the WTO (Busch, Reinhardt and Schaffer, 2009). Horn, Nordström and Mavroidis (1999) build a model that studies a country's probability of detecting and contesting a trade barrier. They argue that the differences in diversity and value of trade between countries can explain why some countries initiate more disputes. The second issue relates to the panel phase and the preparation of a case for litigation. WTO litigation is costly and time-consuming (Sevilla, 1998). Developing countries lack the legal capacity to absorb the costs of adequately preparing a case for WTO litigation.<sup>ii</sup> Consequently, they have to rely on outside experts and are less sophisticated buyers of legal advice (Trade and Development Centre, 1999). Van Kerckhoven and Crombez (2015) study in

more detail how a cost disadvantage pushes developing countries to take different decisions within the WTO DSU. In that paper, we find that developing countries will file less complaints, and if they do so, settle more easily before the panel stage, since they lack the financial resources and legal capacity to prepare adequately for the panel stage. The latter finding also applies to developing country defendants. Busch and Reinhardt (2003b) argue that the lack of legal capacity is the main challenge for developing countries in international trade litigation. Bown (2004, 2004b, 2005) studies when negatively affected parties engage in WTO litigation, both as complainant and as a third party. He finds that, among others, the capacity to absorb expected litigation costs, and the political economy costs due to engaging in WTO litigation are important determinants in this decision.

So far, few studies have incorporated a strategic approach to the study of the WTO DSU. A notable exception to this is Sattler, Spiker and Bernauer (2014). Their focus on the WTO DSU as an enforcement device versus the WTO DSU as an informational device provides interesting evidence that the WTO mainly works as an enforcement device. Our understanding of the WTO DSU, as a prime example of a clear-cut legislative process in which states make deliberate choices, is to benefit greatly from further strategic studies. We contribute to the literature by presenting a strategic structural model that looks into the determinants of the escalation of trade conflicts within the WTO DSU. More specifically, by looking into the decisions of developing and developed countries at two escalation phases, this paper provides an important contribution to the existing literature as it unveils some of the forces driving developing countries, both as defendants and as plaintiffs in these two different escalation phases. The next section portrays the basic set-up of our approach by lining out the two escalation phases and the variables that might determine the actions of countries within the WTO DSU.

### **3. The set-up**

#### **3.1 The two escalation phases**

A trade conflict between 2 (or more) WTO member states can result in the filing of a complaint at the WTO.<sup>iii</sup> When the provisions in the WTO DSU are called upon to assist with the settlement of a trade dispute, a certain sequence of steps are taken.

When a country (“the complainant or plaintiff”) initiates a WTO dispute regarding the trade policy of another member of the organization (“the defendant”), the parties are first encouraged to engage in consultations in order to find a satisfactory solution without resorting to litigation (Art.4 of the DSU). In

this paper, it is the complainant who will decide whether to propose a settlement offer that the defendant can accept.

When consultations fail to produce a mutual satisfactory outcome, the dispute escalates to the panel phase. This generally indicates that the conflict between the trade partners over the trade policy at hand is too large or that the parties' positions are too far apart. For example in the European Communities-Measures prohibiting the importation and marketing of (DS-400 European Communities — Measures Prohibiting the Importation and Marketing of Seal Products), the EU took action after a public outcry, whereas Canada decided to stand behind the thousands of Canadians that depend on the seal harvest to provide a livelihood for their families.<sup>iv</sup> Clearly, when the positions of the parties are so far apart, consultations are deemed to fail. Moreover, in the seal case, the public on both sides of the Atlantic would not easily be satisfied with a negotiated deal.

When consultations fail, a panel of WTO experts is established (Art.6, Art. 7 and Art.8 of the DSU). The panel rules on the consistency of the defendant's trade policy with the WTO provisions. After it has released its recommendations in the form of a report, the parties to the dispute are allowed to contest the legal correctness of the panel findings. If such an appeal concurs, the Appellate Body investigates whether the panel has erred in its judgment in its legal interpretation.

After the panel has released its ruling, the defendant is requested to implement the panel's recommendations. Moreover, the dispute can still be settled bilaterally. In the case of a bilateral settlement and when the defendant swiftly implements the panel ruling, the conflict ends rather peacefully. In this case, the defendant makes at least some commitments and adapts its policy. When the defendant fails to implement the panel recommendations, the dispute further escalates. The plaintiff can then request the authorization to temporary suspend (part of) its WTO concessions towards the defendant.

However, the decision of the defendant to refuse to adapt its policy is often not greeted favorably by the parties, as this generally results in a larger conflict, and significant public attention. Hence, the defendant makes the decision between adapting its policy, or leaving the policy as is, which might result in CVMs. Standing strong by keeping the policy in place is hence a costly undertaking, as the CVMs to offset the plaintiff's loss might be quite substantial. However, this might be more beneficial in certain cases, in particular when the public supports the defendant's government stance. For example, in the series of disputes revolving around beef hormones, the European public is concerned with the health

risks of hormone treated beef, thus supporting the EU in standing strong.<sup>v</sup> The division between policy adoption and standing strong allows us to assign a relatively large amount of observations to each of the different outcomes of a dispute. Table 1 displays the number of trade conflicts at the two escalation phases,<sup>vi</sup> namely, the panel phase and the implementation phase.

#### **TABLE 1 AROUND HERE**

This table shows us that a majority of the disputes get settled during negotiations in the consultations phase. A minority of the disputes lead to the establishment of WTO panels. After the panels have reviewed the trade policy at hand, most disputes end with a policy change. This can be done by either implementing the panel recommendations, or by finding a post-panel agreement. A significant amount of disputes however escalate further whereby the defendant decides to keep its policy as is, and the plaintiff requests the authorization to suspend concessions to the defendant.

However, these numbers only tell part of the story. If we study the disputes in greater detail, it becomes clear that there are several variables that might determine how far a trade conflict escalates within the WTO dispute settlement.

### **3.2 The determinants of the escalation of trade conflicts**

In this paper, we focus mainly on the economic variables that might drive a country to escalate a dispute.

We study the impact of eight variables that might determine whether a WTO conflict escalates in the two panel phases: whether the plaintiff is a developing country, whether the ACWL has been involved, whether the defendant is a developing country, whether the trade policy concerns a political sensitive industry, whether the trade policy concerns a primary sector, the trade dependency between the parties, whether either party has experience with CVMs, and whether the dispute involves multiple complainants.

It is a well-established finding that developing countries are, even with all the support and exceptions offered to this type of countries, falling short in realizing the same benefits from WTO litigation as their more developed counterparts. We use a dummy variable for all developing country plaintiffs and defendants.<sup>vii</sup> We expect to see settlement more often during the consultation phase when either of the parties is a developing country. Wary of the high cost of referring a dispute to the WTO panels, developing countries might be more inclined to settle in the consultations phase than developed



countries.<sup>viii</sup> Moreover, once a panel is established, we expect developing country defendants to implement the panel's recommendations more often, rather than risking the installation of CVMs on their exports. CVMs can be very harmful for developing countries, as their exports mostly consist of very competitive labor-intense products.

A developing country plaintiff prefers bilateral settlement in the last phase (although it is the defendant that chooses at this decision node). Developing country plaintiffs might find it difficult to threaten with CVMs. They might fear that installing CVMs might bring havoc to their relation with the counterparty, from whom they might need trade flows and aid. Moreover, developing countries typically do not consume enough of the defendant's exports to credibly threaten with CVMs (Dam, 1970).

In total, 174 developing countries have launched a complaint at the WTO DSU, of which 74 complaints have resulted in the establishment of a panel. Of these 74, 19 complaints were not implemented by the defendant, and resulted in an escalation of the dispute whereby the authorization to suspend concessions was requested by the developing country plaintiff. Developing country defendants have been targeted in 161 complaints. 106 of these disputes were settled during the consultation phase, and 55 of the complaints against a developing country were reviewed by WTO panels. Only four of these complaints resulted in the request to authorize a suspension of concessions.<sup>ix</sup>

As a third variable, the involvement of the Advisory Centre on WTO Law (ACWL) might have scaled down the differences between developing countries and developed countries. As the ACWL provides developing countries with legal support at a reduced cost or pro bono (for more see Van der Borgh, 1999), its support might offset the developing nature of some parties to a WTO dispute. Bown and McCulloch (2010) empirically investigate the working of the ACWL, and argue that the introduction of the ACWL has not been able to expand the number of developing countries that get involved in the WTO DSU. Nonetheless, it has helped parties that were already part of a dispute to start making more ample use of trade litigation. Involvement of the ACWL could hence blur our results when looking at the actions of developing countries, since the actions taken with support of the ACWL might mirror the ones taken by developed countries more. To control for this, we add a dummy variable indicating whether the ACWL has been involved or not. With regards to ACWL support for defendants (8 times), all cases escalated to the WTO panels, followed by a policy change afterwards, leaving us with only little variation. When a plaintiff calls upon the ACWL for support (24 times), we expect that the ACWL's involvement results in more panel rulings, but that after a panel ruling more settlement will be

witnessed, since the ACWL is there to a large extent to make full use of settlement in order to reap more benefits (Busch and Reinhardt, 2003).

Fourth, we include trade dependency as a variable. Bown (2004 and 2005) looks into the WTO disputes related to American anti-dumping cases. He finds that the extent to which the plaintiff can punish the defendant by erecting CVMs on the defendant's products is an important determinant of the outcome of WTO litigation. Guzman and Simmons (2002) find that higher exports from the defendant to the complainant result in more panel involvement. The reason might be that installing CVMs is more feasible when a higher percentage of the defendant's export go the plaintiff's market. Horn, Nordstrom and Mavroidis (1999) relate to this research and find that export diversity influences the route of a WTO dispute. In particular, developing country plaintiffs might find it difficult to install CVMs on the products of the defendant. Due to their dependence on imported goods, and the typically lower size of imports, punishing another WTO member by installing CVMs is rather difficult. The other way around, a developing defendant can be seriously hurt when CVMs are installed on its exports.<sup>x</sup> Bown (2005) and Horn, Mavroidis, and Nördstrom (1999) empirically find evidence for the fact that installing CVMs is a difficult exercise when the plaintiff has only very little imports from the defendant. For this reason, we calculated the following:  $\frac{X^{D \rightarrow C}}{Total X^D}$ , with  $X^{D \rightarrow C}$  denoting exports from the defendant to the complainant, and  $Total X^D$  the exports of the defendant. This will feature in the defendant's decision whether or not to implement the panel recommendations, or escalate the dispute and hence potentially incur CVMs. A high export ratio is expected to lower the expected utility of CVMs. Moreover, a plaintiff is also expected to get a higher utility from CVMs when this measure is high.

As a fifth variable, the experience of countries with CVMs might be important. As shown by Davis and Blodgett Bermeo (2009), there exists a certain learning curve towards engaging in WTO litigation. Having experience with CVMs increases the likelihood that the dispute leads to non-implementation. Firstly, this might influence the decision of the plaintiff in the first step of the game where he decides between settling the dispute bilaterally, or composing a panel. Secondly, this might also affect the defendant's decision whether or not to implement a panel recommendation.

Following Sattler, Spiker, and Bernauer (2014), our sixth variable deals with political sensitive issues. Sattler, Spiker and Bernauer (2014) argue that all manufacturing sectors have lower political stakes than non-manufacturing sectors. However, we feel that this measure fails to adequately describe political sensitive sectors. There are various non-manufacturing sectors that are less political sensitive than some

manufacturing sectors. Think for example about the Boeing-Airbus dispute that has been grabbing newspapers headlines for some years. Since we concur that certain industries involve higher political stakes than others, we establish our own measurement. Some more political sensitive cases include the EU-US disputes on hormones and the Boeing-Airbus disputes. In general, cases related to environmental standards, agriculture, and sanitary and phytosanitary measures tend to be more politically sensitive than other cases due to their influence on health. The same holds true for disputes involving large employers and national champions, such as the airline industry (Crombez, Van Kerckhoven and Van Gestel, 2011). This relates to the difference between continuous and discontinuous policies (Guzman and Simmons, 2002). Tariffs are more easily adopted and offer more negotiation room than one-off decisions, such as whether to allow hormone-treated meat into the EU. Political sensitive disputes tend to revolve around these discontinuous policies. Consequently, this paper uses a dummy for all disputes mentioning one of the political sensitive WTO agreements. These are the Agreement on Agriculture, the SPS agreement, and the Agreement on Trade in Civil Aircraft (hereafter political agreements). Political sensitivity plays a dual role. We expect to see more bilateral settlement during the consultation phase. For more political sensitive cases, governments will want to avoid the potential political backlash that occurs when public awareness heightens. This backlash is higher when a dispute escalates to panels which increases the likelihood to be grabbing newspapers' headlines. However, after a panel ruling, the defending party will be more inclined to stand strong and incur CVM's rather than implement the panel's recommendations. We use a dummy variable for this.

Our seventh variable relates to whether the sector is R& D intense. Davis and Shirato (2007) looked into Japan's selection of trade barriers for WTO litigation. They find that low-velocity industries, characterized by few product lines, low product turnover, and little R&D are more prone to be selected for WTO litigation. Busch and Reinhardt (2003) come up with a similar remark. Horn, Mavroidis, and Nordstrom (1999) also clearly show that these low-velocity industries feature remarkably extensively on the WTO dispute settlement list. Since WTO litigation is rather specific, industries with less R & D intensive products, and hence a longer life span, feature heavily on the list of WTO disputes. More R&D intense sectors have a quicker product turnover. Hence, they face larger opportunity costs from waiting and investing time and devoting resources to WTO litigation. Consequently, they are expected to feature less in WTO complaints, and settle earlier in the WTO dispute game. Non-R&D intense sectors on the other hand find it more beneficial to sit out the full WTO litigation process, since the low product volatility allows the complaining party to reap the benefits of WTO litigation for a long time period after the issue has been settled. For these sectors, the additional time that it takes to let the panels look into

the trade policy is less a deterrent. Indeed, involving WTO panels lengthens the time before the trade policy is adapted from an average of 731 days when no panels are involved upwards to an average of 1245 days with panel involvement.

As a last variable, we include a dummy for disputes with multiple complainants. The effect of this variable is a little bit less obvious. It might be that implementation is preferred because of the high cost of non-compliance when all complainants install CVMs on the defendant. However, it might also be that it is more difficult for each of these countries to install CVMs. In this paper, we break the multiple complainant disputes up in individual bilateral dyads. This is in line with previous empirical studies of the WTO. We then add a dummy variable for when a dispute involves several complainants at the same time. This is in line with other empirical analyses of the WTO (see Horn, Mavroidis and Nördstrom, 1999, Reinhardt, 2001). We do not include the multiple complainants dummy in the plaintiff's utility function since we could not find any support for the question whether this results in more (or less) early settlement. Table 2 comprises all the variables included in the model.

#### **TABLE 2 AROUND HERE**

These variables will now be tested in a strategic empirical model of the escalation of trade conflicts at the WTO. Our focus on the strategic behavior of defendants and plaintiffs allows us to investigate the determinants of the settlement and escalation of trade conflicts in a simple game theoretic framework. Table 3 presents the summary statistics for all these variables.

#### **TABLE 3 AROUND HERE**

## **4. Empirical Analysis**

### **4.1 The Data**

The dataset entails data from several sources. All data concerning the WTO disputes were obtained from the Horn and Mavroidis (2011) dataset. This dataset includes the timeline, the sectors and the legal provisions invoked from all WTO disputes until dispute 426 (11/08/2011). We updated the disputes in the database to ensure that all the outcomes of the disputes were correct until 23/09/2014. Trade data were gathered from the World Integrated Trade Solution (WITS) website. This dataset only includes combined EU trade data. Since several disputes were initiated by individual EU member states (in particular before 2000), we used the Eurostat dataset for these disputes. The WITS uses the same

data but on the aggregate EU level, so this does not change the data measurements. We further used the WTO's codification for developing countries.

Since this paper focuses on the escalation of trade conflicts, and since we do not model the WTO panels as active players, we left out the 24 disputes whereby no violation by the defendant was found. Including these observations might have skewed our results since they do not fit within the model we present below where we focus on the escalation phases. Six more cases had to be dropped since we lacked information for at least one of the variables. Moreover, since nine cases are still ongoing, which means that in the last 3 years some action was undertaken (either the composition of a panel or a panel/AB ruling), we could not include these as the final outcome is yet to be determined.<sup>xi</sup> In the end, we have 236 cases of settlement during the consultation phase, 130 disputes that resulted in implementation of the panel's recommendations, and 45 observations where the authority to retaliate was requested at a certain point during the dispute (see table 1).

## **4.2 The Game Theoretic Model and Statistical Backwards Induction**

### **4.2.1 The Extensive Game Form**

Figure 1 presents the WTO litigation game, with its two escalation phases, in its extensive form.

We present a simple model of the WTO's dispute settlement. Both governments are utility-maximizing and rational. Moreover, the governments in our model are forwards-looking. Hence, when the plaintiff drafts its settlement offer in the consultations phase, he will take into account the actions of the defendant, who gets to play when the WTO panels have been involved. More specifically, the plaintiff will take into account his expected utility from each of the different actions the defendant can take.

We focus on the escalation at two phases: the panel stage and the implementation stage. At each of these stages, the dispute can escalate. At the panel stage, a dispute can escalate into the establishment of a panel, rather than a bilateral settlement. At the implementation stage, a dispute can escalate whenever no bilateral settlement is agreed upon and whenever the defendant fails to implement the panel's ruling. In this instance, the dispute escalates when the plaintiff requests the authorization to suspend some of its concessions towards the defendant as a means of punishment. At each of these escalation phases, one of the two parties has to decide which action to take. At the first escalation phase, the distinction between offering a settlement or empaneling a dispute is relevant when we model the pay-offs of the plaintiff. The first escalation phase boils down to either a friendly solution to

the conflict or an escalation to WTO panels. Settling a dispute during the consultations is a risk-free option. When the dispute escalates and WTO panels get involved, the dispute will become a rather costly undertaking, without any guarantee that eventually the defendant will adapt its policy. However, there are certain considerations that might push a plaintiff to empanel a dispute. The plaintiff might decide to involve panels out of political considerations, as launching a real WTO investigation might signal the plaintiff's domestic industry that it is willing to stand strong. Furthermore, the plaintiff might expect a better settlement after the WTO panels have released their opinion. However, in this case, it is also possible that the plaintiff underestimates the defendant's willingness to stand strong, which the latter can do by refusing to adapt its policy. This is incorporated in the structural model, as none of the parties to the dispute has perfect information regarding the other party's pay-offs.

At the second escalation phase, the defendant gets to choose to adapt his policy by either adapting its policy (by implementing the panel's recommendations or finding an agreement with the plaintiff), or stand strong and keep its policy as is, with the risk of facing CVMs. The defendant tries to maximize its utility given the decision of the plaintiff in the first escalation phase. If CVMs are not costly for the defendant, or when the latter wants to stand strong, the defendant will be less likely to adapt its policy. Notably, we focus on the panel rulings, rather than the eventual outcome of a dispute in terms of policy changes (for an analysis of the eventual level of concessions, see Busch and Reinhardt, 2000, 2003). This results in the following simplified game tree (see fig.1).

#### **FIGURE 1 AROUND HERE**

The settlement of trade disputes at the WTO is a rather complex process. Trade policies, and the parties' positions change over time. Public and secret negotiations can also be carried out, which might deter the filing of a complaint. Moreover, as shown in Van Kerckhoven and Crombez (2015b), the industry-government interaction in the preparation of a case for WTO adjudication results in biased adjudication, whereby certain trade barriers are less disputed than others. Furthermore, a party's decisions might be motivated by elements that go beyond the dispute at hand. The decisions within WTO litigation might be influenced by political considerations or as a means to settle old scores. In short, the whole trade litigation game is dynamic and complex. All these elements make it challenging to identify and unveil the exact forces at work. In this paper, we consequently narrow our focus to official WTO disputes, and we focus on more quantifiable economic variables. We model the interaction between the plaintiff's and defendant's government as a one-shot game. Albeit a simplification of the overarching grand process of

trade litigation, the focus on this single sub-game allows us to unveil some of the determinants of the decisions of governments within the WTO's dispute settlement.

It allows us to look at which variables affect the utilities of the players at the different steps of the game tree. When countries are forward looking, their choices at the consultations phase of the WTO dispute settlement are made in anticipation of the expected actions taken by the other country in the implementation phase of the litigation process. We model WTO litigation as in figure 1. Based on this model, we can deduct the likelihood that certain actions are taken in both phases.

The game hence has 3 different outcomes: (1) *CVMs* are observed when the plaintiff engages panels (*ep*), and the defendant stands strong (*ss*), (2) *Implementation* is observed the plaintiff engages panels (*ep*) and the defendant adapts its policy (*ap*), (3) *Bilateral settlement* is observed when the plaintiff offers a settlement.<sup>xii</sup>

We do not treat the panel as an active party in the WTO DSU. The WTO panels work as impartial arbitrators and can consequently not be modeled as an actor in its own right, as the panels make no strategic decisions.

#### **4.2.2 Structural Model**

Strategic interaction is a fundamental consideration when one studies conflicts (Signorino, 1999, 2003). This certainly applies to trade conflicts as well. Therefore, we apply a model of statistical backwards induction (SBI) (Bas, Signorino and Walker, 2008). This approach allows to incorporate the sequence of the strategic actions of the players in an empirical setting. The biggest advantage of SBI over traditional statistical models is that SBI incorporates that the parties to a WTO dispute base their decisions on the respective assessments of the consequences of realizing certain outcomes. Importantly, empirical analyses that ignore the theorized underlying strategic relationships (e.g., by either applying traditional models of discrete events, such as logit or probit, or selection models, such as bivariate probit) produce biased estimates and incorrect inferences (Signorino 1999, 2002, 2003; Signorino and Yilmaz 2003).

By applying a SBI model, we can study the escalation phases within WTO dispute settlement by incorporating the actions and the sequence of the players. Since the defendant observes the actions of the plaintiff, this is a fully recursive model. If there is no incomplete information about the utilities for neither the parties nor the researcher, the game can be solved by backwards induction for any given specification of the utilities. If there is a single unique subgame perfect equilibrium for any particular

specification of utilities, such model can not be applied in an empirical fashion. The latter requires a probability model that puts some positive probability over all the outcomes (Signorino, 1999). Hence, for our analysis we assume that each party's utility incorporates a private component. The true value of this component is only known by the party itself, whereas the other party and the researcher only know its distribution. In doing so, we add some agent error to the model. More specifically, players might sometimes misperceive each other's utilities or might err in implementing their actions. Agent error enters the model via choices or actions at the information sets of the players rather than through the outcome utilities (which would result in a model with private information over the size of the utilities). As the variance of the error terms goes to zero, the model becomes one of players with perfect and complete information, who maximize their utility at each decision point. Therefore, in the limit, the equilibria are subgame perfect. As the variance of the error terms increases, the equilibria may at times resemble smoothed versions of the subgame perfect equilibria, but may at other times look very different from the subgame perfect equilibria because the choice probabilities affect expected utility calculations.

Consequently:

$$U_D^*(ap) = U_D(ap) + \alpha_{ap} = U_D(I) + \alpha_{ap}$$

$$U_D^*(ss) = U_D(ss) + \alpha_{ss} = U_D(CVMs) + \alpha_{ss}$$

Where  $U_D^*(x)$  is the true utility for the defendant ( $D$ ) of taking action  $x$  (the possible actions of the defendant are to stand strong ( $ss$ ) or adapt the policy ( $ap$ )).  $U_D(x)$  is the part of the utility that is observable to the plaintiff and the analyst, and  $\alpha$  is a random component of utility which is only observable to the defendant. We assume that the defendant maximizes its true utility. Because the defendant's actions determine the final outcomes, the utilities of his chosen action ( $ap/ss$ ) are identical to the utilities the defendant realizes at the related outcomes implementation and CVMs ( $I/CVMs$ ).

As analyst, we do not observe the  $\alpha$  terms and hence we can only make probabilistic statements about whether the defendant wants to stand strong or adapt its policy. We can only derive choice probabilities if we make assumptions about the distribution of the private components of the utilities. We assume that this distribution is Type I Extreme Value, which in turn results in logit probabilities. More specifically, the probabilities that the defendant adapt its policy ( $p_{ap}$ ) or stands strong ( $p_{ss}$ ) are given by:



$$p_{ap} = \frac{e^{U_D(I)}}{e^{U_D(I)} + e^{U_D(CVMS)}}$$

$$p_{ss} = \frac{e^{U_D(CVMS)}}{e^{U_D(I)} + e^{U_D(CVMS)}}$$

We can now turn to the first escalation phase: the panel phase. If the plaintiff makes an offer that is acceptable to the defendant (*os*), the game ends with bilateral settlement (BS). If this is not the case, the conflict escalates as the plaintiff decides to engage panels (*ep*). The plaintiff's decision whether to settle or empanel the dispute is a deliberate choice, and depends on its assessment of the predicted actions of the defendant. The complainant's utilities ( $U_C$ ) of offering a settlement (*os*) (which ends the game in bilateral settlement (BS)) and of escalating to panels (*ep*) are given by:

$$U_C^*(os) = U_C(os) + \alpha_{os} = U_C(BS) + \alpha_{os}$$

$$\begin{aligned} U_C^*(ep) &= EU_C(ep) + \alpha_{ep} = p_{ap}U_C(I) + p_{ss}U_C(CVMS) + \alpha_{ep} \\ &= p_{ss}U_C(CVMS) + (1 - p_{ss})U_C(I) + \alpha_{ep} \end{aligned}$$

We now make the assumption that we, as analysts, face the same uncertainty as the players. Due to our assumption that the private component of the plaintiff's utility is distributed Type I Extreme Value, the probabilities of the plaintiff to undertake either action (*os/ep*) are logit probabilities. Notably, they are based on expected utility calculations and consequently do not take the typical logit form. The probability that the plaintiff offers a settlement or decides to involve panels are respectively:

$$p_{os} = \frac{e^{U_C(os)}}{e^{U_C(os)} + e^{EU_C(ep)}} = \frac{e^{U_C(os)}}{e^{U_C(os)} + e^{p_{ap}U_C(I) + p_{ss}U_C(CVMS)}}$$

$$p_{ep} = \frac{e^{U_C(ep)}}{e^{U_C(os)} + e^{EU_C(ep)}} = \frac{e^{p_{ap}U_C(I) + p_{ss}U_C(CVMS)}}{e^{U_C(os)} + e^{p_{ap}U_C(I) + p_{ss}U_C(CVMS)}}$$

The equilibrium probabilities of the strategic model are consequently ( $p_{os}, p_{ep}, p_{ap}, p_{ss}$ ). Given the assumption that the uncertainty is derived from Type I Extreme Value perturbations to the action utilities, the above equilibrium is a Logit Quantal Response Equilibrium (McKelvey and Palfrey, 1998). Since we take these perturbations to be independently distributed, we can calculate the outcome probabilities by multiplying the action probabilities along the route a dispute takes. The outcome probabilities (Pr) are consequently:

$$\Pr(BS) = p_{os}$$

$$\Pr(I) = p_{ep} * p_{ap}$$

$$\Pr(CVMs) = p_{ep} * p_{ss}$$

We can now specify the system of latent variable equation on which we build the empirical analysis. We observe the choice of actions of the players and assume that:

$$y_C = \begin{cases} 1, & \text{if } U_C^*(ep) > U_C^*(os) \\ 0, & \text{if } U_C^*(ep) < U_C^*(os) \end{cases}$$

$$y_D = \begin{cases} 1, & \text{if } U_D^*(ss) > U_D^*(ap) \\ 0, & \text{if } U_D^*(ss) < U_D^*(ap) \end{cases}$$

whereby  $y_C=1$  and  $y_D=1$  correspond to the plaintiff choosing to involve panels, and the defendant choosing to stand strong. The equilibrium action probabilities can hence be written as  $p_{ep} = \Pr(y_C = 1)$  and  $p_{ap} = \Pr(y_D = 1)$

The system of latent variables underlying our empirical model can now be specified as:

$$y_C^* = U_C^*(ep) - U_C^*(os)$$

$$y_D^* = U_D^*(ss) - U_D^*(ap)$$

with  $y_j = 1$  if  $y_j^* > 0$  and  $y_j = 0$  if  $y_j^* < 0$  for  $j \in (C,D)$ .

The above model is a strategic random utility model. When we assign regressors to the utilities of both players at the different outcomes, we can estimate the action and outcome probabilities using maximum likelihood estimation. Before we specify the regressors, we can derive the analytical form of the coefficients using a system with a single parameter and regressor. Let the plaintiff's utility under the three different outcomes be specified as:

$$U_{C,BS}^* = \alpha_1 + \beta_1 X$$

$$U_{C,I}^* = \alpha_2 + \beta_2 X$$

$$U_{C,CVMs}^* = \alpha_3 + \beta_3 X$$

We can now normalize these equations to the bilateral settlement outcome, which results in the following:

$$U_{C,BS}^* - U_{C,BS}^* = 0$$

$$U_{C,I}^* - U_{C,BS}^* = (\alpha_2 - \alpha_1) + (\beta_2 - \beta_1)X$$

$$U_{C,CVMs}^* - U_{C,BS}^* = (\alpha_3 - \alpha_1) + (\beta_3 - \beta_1)X$$

The plaintiff will hence decide to empanel a dispute when

$$(1 - \hat{p}_{ss})(U_{C,I}^* - U_{C,BS}^*) + \hat{p}_{ss}(U_{C,CVMs}^* - U_{C,BS}^*) > 0$$

Whereby  $\hat{p}_{ss}$  is observed probability that the defendant will stand strong. Given these specifications, the plaintiff's decision rule can be written as:

$$[\beta_2 - \beta_1 - \hat{p}_{ss}(\beta_2 - \beta_3)]X + (1 - \hat{p}_{ss})\alpha_2 + \hat{p}_{ss}\alpha_3 - \alpha_1$$

Solving this, the coefficient of  $X$  is  $[(1 - \hat{p}_{ss})\beta_2 + \hat{p}_{ss}\beta_3 - \beta_1]$

In order to facilitate the interpretation, we make some reasonable additional assumptions about  $\beta_1$ ,  $\beta_2$  and  $\beta_3$ . If a regressor is only relevant for a single outcome, we can simplify the interpretation. For example, the size and nature of CVMs only affects the plaintiff's utility once the CVMs have materialized. As a result, the coefficient simplifies to  $\hat{p}_{ss}\beta_3$ . In other instances, it makes sense to assume that the parameters are affecting the utilities for two outcomes. There may be costs related to the empanelment of a dispute irrespective of the defendant's decision whether to end the conflict with CVMs or implementation. In this case, the coefficient of  $X$  is equal to  $\beta_2$  and  $\beta_3$ .

We now only need to make one more assumption, namely that when the plaintiff decides to involve WTO panels, he is not able to reverse this decision. More precise, when the plaintiff involves WTO panels, the utilities eventually realized by the plaintiff are decided upon by the defendant. This is a simplification of the WTO litigation model as the plaintiff might settle after panels for a lower reward, if this enables the plaintiff to push the defendant away from standing strong. However, given the fact that we model the plaintiff as forward-looking, and enable the plaintiff to have some information (albeit imperfect) about the utilities of the defendant, this assumption seems reasonable.

This setup ensures that the parameter estimates are not biased and inconsistent (Signorino and Yilmaz, 2003). The SBI produces consistent estimators for all parameters, and for the error terms of the defendant, since his actions do not depend on any auxiliary parameters. The standard errors of the plaintiff's parameters might be biased, but we can address this issue by bootstrapping the standard errors. This is necessary since the choice of the plaintiff depends on the expected choice of the defendant. The predicted probabilities are substituted into the plaintiff's equations, and are afterwards entered as data for the plaintiff's decision. Consequently, a correction for the presence of the random action probability is necessary. Bas, Signorino, and Walker (2008) show that a nonparametric bootstrap solves this issue.

#### **4.2.3 Pay-offs**

The model above presents three different possible outcomes, namely bilateral settlement, implementation and CVMs.

At the panel escalation phase, the plaintiff calls the shots. Its utility for bilateral settlement has been normalized to zero. However, when he decides to engage panels, utilities at the two outcomes are realized. Its decision to engage panels is determined by the variables at the outcomes. At the implementation outcome, the two variables at play are whether the plaintiff is a developing country and whether the ACWL has been involved.

When the game ends in CVMs, the plaintiff's initial decision to engage panels will have been impacted by whether the issue at hand is political sensitive, whether the industry involved is a primary sector, whether the defendant is a developing country, whether there are significant exports from the defendant to the plaintiff, and whether the plaintiff has dealt with CVMs before.

At the last step, the defendant's utility will depend on certain variables. First, the defendant's utility will be lower with CVMs when the defendant is a developing country. In this case, the installation of CVMs on his exports are a serious threat as these might be very harmful to a developing country. However, when the defendant faces a developing country plaintiff, the utility from escalating is higher since a developing plaintiff might be less capable of installing CVMs. The defendant's utility of CVMs will also be lower when the plaintiff has ample opportunity to retaliate. Prior involvement with CVMs might also result in a higher utility for the defendant of escalating the dispute. Letting a political sensitive issue escalate might also result in more utility, as domestic audiences might approve of such a hard stance. When there are multiple complainants, the defendant might implement the panel rulings more easily,

since that if he lets the dispute escalate, more parties can request CVMs on his products. However, it might also be that reaching a settlement with multiple complainants is more difficult than when facing only one party.

The plaintiff realizes different utilities depending on the two possible actions of the defendant. First, a developing country plaintiff could be expected to prefer settlement or implementation. Additionally, the ACWL might also help parties to take full advantage of the WTO dispute settlement, which in case of developing countries could relate to better settlement offerings. Second, we expect the plaintiff to get more utility from CVMs when the issue at hand is a political sensitive sector or a primary sector. The same holds when the plaintiff faces a developing country defendant, when he has more exports going to the defendant (easier retaliation) and when he is more experienced with CVMs.

Following the theoretical considerations, we can assign the variables to the outcomes as follows (in brackets the abbreviations):

$$U_{C,BS} = 0$$

$$U_{C,I} = \beta_{C,6} \textit{Developing Country Plaintiff (DCP)} + \beta_{C,7} \textit{ACLW}$$

$$U_{D,I} = 0$$

$$\begin{aligned} U_{C,CVMs} = & \beta_{C,1} \textit{Political Sensitive Issue (PSI)} + \beta_{C,2} \textit{Primary Sector (PS)} \\ & + \beta_{C,3} \textit{Developing Country Defendant (DCD)} + \beta_{C,4} \textit{Trade Dependency (TD)} \\ & + \beta_{C,5} \textit{Prior Involvement with CVMs (PIC)} \end{aligned}$$

$$\begin{aligned} U_{D,CVMs} = & \beta_{D,1} \textit{Trade Dependency (TD)} + \beta_{D,2} \textit{Developing Country Defendant (DCD)} \\ & + \beta_{D,3} \textit{Developing Country Plaintiff (DCP)} \\ & + \beta_{D,4} \textit{Prior Involvement with CVMs (PIC)} + \beta_{D,5} \textit{Political Sensitive Issue (PSI)} \\ & + \beta_{D,6} \textit{Multiple Complainants (MC)} \end{aligned}$$

This gives rise to two logit regressions to be estimated. The first one estimates the coefficients for the defendant's decision to stand strong and incur CVMs. The second one estimates the coefficients for the plaintiff's decision to empanel a dispute, which takes into account the predicted probabilities of the defendant's decision at the second escalation phase ( $p_{ap}$  and  $p_{ss}$ ). The regressors are based on the utilities described above, whereas the logit form has been discussed more extensively in section 4.2.2.

Hence we perform a logit regression for the defendant:

$$p(y_D = 1|y_C = 1) = \frac{1}{1 + e^{-(\beta_{D,0} + \beta_{D,1}TD + \beta_{D,2}DCD + \beta_{D,3}DCP + \beta_{D,4}PIC + \beta_{D,5}PSI + \beta_{D,6}MC)}}$$

And for the plaintiff:

$$p(y_C = 1) = \frac{1}{1 + e^{-(p_{SS}*(\beta_{C,1}PSI + \beta_{C,2}PS + \beta_{C,3}DCD + \beta_{C,4}TD + \beta_{C,5}PIC) + p_{ap}*(\beta_{C,6}DCP + \beta_{C,7}ACLW))}}$$

## 5. Results and Discussion

It is important to take into account the fact that there are both direct and indirect utilities in this game. Due to the forward-looking nature of the dispute parties, the variables featuring in the last stage will also indirectly appear in the utility functions at the earlier stage. The direct influence is observable in the regression terms, whereas the indirect influence enters the probabilities that drive the plaintiff's decision at the consultation phase. The direct and indirect effects can offset each other.

### 5.1 Implementation Phase

Let us first start at the last stage, whether the defendant decides to let the dispute escalate or whether to adapt his policy (by implementing the panel recommendation or settling the dispute).

As shown in table 4's first column, the defendant could get a higher utility from escalating a dispute when a few determinants are at play.

The defendant gets a higher utility from escalating the dispute when he exports more to the plaintiff. This is in conformity to the commonly held view in the literature. It might hence be that countries with higher trade values between them end up escalating WTO disputes more often. The large number of EU/US disputes ending in CVMs might bias these findings. Since these two economies are often head to head on a large number of trade disputes, their trade frictions account for almost 20% of all WTO disputes. Compared to the other WTO dispute parties, their bilateral disputes often end in CVMs.

Being a developing country lowers the utility of standing strong. So, developing countries defendants are more likely to adapt their policy. This is in line with the findings of relevant literature on this topic.

**TABLE 4 AROUND HERE**

In conformity with the literature, the defendant gets a higher utility from escalating the dispute when he has prior experience with CVMs and when the issue at hand is politically sensitive. A defendant who has been involved in CVMs before, benefits more when escalating the dispute further. This clearly shows that there might be some learning effects in dealing with CVMs. When the issue is of a more political sensitive nature, the defendant will gain by standing strong, and showing support to the industry involved. In disputes involving multiple complainants, the defendant might also prefer CVMs over settlement. This can be due to the fact that he might expect that not all plaintiffs might want to install CVMs. Literature yet has to study this issue further in order to draft strong conclusions about the role of multiple complainants in WTO dispute settlement. Moreover there is a strong negative constant term, which demonstrates that escalation comes at a cost at the implementation phase. The predictive power of the model at this step is rather high (81,14% correctly specified).

## **5.2 Panel Phase**

Anticipating the defendant's decision at the implementation phase, the plaintiff makes his decision to offer a settlement or empanel a dispute. In order to estimate this regression, we transform the variables included in the plaintiff's utility of empaneling a dispute. This is done by weighing the variables with the predicted probability that the defendant decides to stand strong or adapt its policy. This predicted probability is generated during the first logit regression (the defendant's decision) (see 4.4.2.2). By doing so, the anticipation of the defendant's decision features in the plaintiff's decision.

At the consultations phase, the plaintiff decides whether to settle or empanel a dispute. We use the probabilities generated during the logit regression for the implementation escalation phase to update the variables in order to determine the plaintiff's utilities at the consultations phase.

Table 4 presents the results of the analysis of the plaintiff's utilities in the second column. Some variables have a positive effect on early settlement while others provide more utility if the dispute escalates to the panel stage.

When the plaintiff is a developing country, he prefers to settle early. Settling early might result in a higher utility for a developing country plaintiff, as this allows him to skip on the costly WTO litigation process. Moreover, also when a plaintiff faces a developing country defendant, he prefers to settle early. This might deter some political backlash, as it might not sit well with the public to let a dispute against a developing country escalate. Moreover, as argued in Van Kerckhoven and Crombez (2015),

developing countries might offer higher concessions during the consultation phase. By doing so, they do not have to incur the legal costs that come when WTO panels are established. The higher concessions might give the plaintiff an higher incentive to settle the dispute before panels are established. In line with the literature, we find that developing countries prefer to settle earlier in the dispute settlement process.

A dispute related to a more political sensitive issue will settle more easily during the consultations. Early settlement allows the parties to find a solution to the dispute before the conflict reaches high public awareness, which causes the parties to save face by standing strong. Having experience with CVMs increases the utility of the plaintiff of escalating the dispute. The ACWL has allowed countries to sit out the dispute until panels have been involved but not to a significant effect. A higher trade dependency also provides the plaintiff with a higher utility from escalating the dispute (albeit not significant). However, a high trade dependency does not lead a defendant to adapt its policy in the implementation escalation phase. Contradictory to our expectations, primary sector involvement leads to more bilateral settlement, but this finding is not statistically relevant.

Furthermore, we can look at the indirect effect by analyzing the constants. Since the constant is negative at the implementation phase, it is clear that the defendant pays a price for standing strong compared to adapting its policy. Some other papers have looked into early settlement (Busch and Reinhardt, 2000 for example). They find that most full concessions are made during the consultations phase. We also find evidence for lower utility realizations when the dispute escalates.

The predictive power at the consultation phase of the model is smaller than at the implementation phase (54,50% correctly specified). This might be due to the strategic sequential nature of our model, which takes interference from the implementation phase.

## **6. Developing countries' decisions in the WTO DSU.**

The approach and the model sketched in this paper allow for a deeper analysis. Some more specific results for developing countries can be identified.

Let us first look into the action probabilities. First of all, a developing country plaintiff indeed settles earlier in the process in general. A case initiated by a developing country plaintiff has a 39,68% chance of making it to WTO panels ( $SD=0,0985$ ). This is still rather high, but significantly lower than the probability



that a developed country's complaint will make it to the panel's phase. About half of the disputes initiated by developed economies (48,12%) make it to WTO panels (SD= 0,1184). This numbers are based upon the probabilities of the escalation to the panel that are influenced by the forward-looking nature of the plaintiff's government. Once a developing country plaintiff's complaint has made it to the WTO panels, the difference in action probability with a developed country becomes very small. The probability that a developing country plaintiff is part of an escalated dispute is 22,01% (SD= 0,20856), pretty much equal to that of a developed plaintiff (probability 23,567% and SD=0,22107). Hence, developing country plaintiffs are more likely to offer a settlement than to empanel a dispute compared to developed countries. However, in the implementation phase, they are as likely as developed countries to face CVMs. This shows that the filing of a complaint is a deliberate decision for developing countries as well. Remarkable is that countries apparently do not care whether the plaintiff is a developing country. Defendants are as likely to stand strong facing a developing country plaintiff as a developed country plaintiff. Thus, developing country defendants are able to attract policy adaptation as much as developed countries. One caveat here is that we do not take into account the exact amount of policy concessions.

Also, developing countries, when on the defending side, have some action probabilities that are different from developed defendants. A dispute involving a developing country defendant is less likely to make it to WTO panels than a dispute with a developed country defendant. The former cases have a 37,29% (SD= 0,10307) probability to make it to the WTO panels, whereas a case involving a developed country defendant has a 49,22% probability (SD=0,10284) to make it to WTO panels. Importantly, developing country defendants are more prone to giving in at the last stage. They only have a 7,27% probability (SD=0,0872584) of picking an escalation of the dispute. Non-developing countries on the other hand have a 34,166% probability (SD=0,2127972) of escalating the dispute. Consequently, developing country defendants are more often part of a dispute that settles in the consultation phase, and are far less likely to not adapt their policy in the implementation phase. Developing countries thus give in very easily in both escalation phases. This might relate to a lack of legal capacity but just as well to a fear of facing retaliation by a plaintiff. The discrepancy in outcomes between developed and developing country defendants is a very important one, and strengthens the call for the strengthening of the ACWL and its work for defendants.

## 7. Conclusion

In this paper, we present a strategic statistical model to look into the determinants that influence the route a WTO dispute takes. We are mainly concerned with the decisions that countries make during WTO dispute settlement. The novelty is that we model forward-looking governments that take into account the decisions of the other party. The paper looks into the different characteristics of WTO parties, to empirically test which determinants might influence the route a WTO dispute takes.

The focus is on testing whether developing countries indeed have equal access and realize similar outcomes with the WTO DSU. The strengthening of WTO litigation has been put forward as a landmark achievement for developing countries. However, academic literature has also been concerned about the real impact of these changes. This paper adds to our understanding of developing countries' actions during WTO dispute settlement. We further include some variables that have been put forward by the literature as determinants for the outcome of a dispute. These are both situated at the country level, and the industry level.

This paper contributes to our understanding of the actions taken by developing countries during WTO litigation. We find that developing country plaintiffs are more likely to offer a settlement than to empanel a dispute compared to developed countries. In the implementation phase, they are not more or less likely to face a stand strong position by a defendant. Consequently, defendants are not concerned with the developing/ developed nature of the plaintiff in the dispute. For developing country defendants, the picture looks even less appealing. Developing country defendants settle a dispute more easily in the consultation phase, and are far less likely to stand strong in the implementation phase. The involvement of the ACWL does not seem to be able to strongly shift these findings. Most importantly, we show that developing countries take different decisions in particular when acting as a defendant. Even when we include a number of other variables in the model, the developing nature of a country remains an important determinant. This also shows in their action probabilities which clearly show that developing defendants take different decisions than their developed counterparts within the WTO DSU.

Future WTO DSU reforms should mainly focus on supporting developing countries when a dispute is filed against them. Moreover, future research should clearly take into account these differences, rather than solely looking at the aggregate outcomes of disputes involving developing countries.

Consequently, it is difficult to argue that the WTO DSU has levelled the playing field for developing countries. We further find evidence for early settlement of political sensitive issues. However, once a panel has been established that deals with these issues, more escalation will be observed. Disputes with multiple complainants also often result in CVMs if not settled during the consultations phase. Prior involvement with CVMs increases the utility of the parties to escalate the dispute to the next phase.

Another important result is that escalation always comes at a cost. When the dispute does not settle in the consultation phase, the plaintiff's utility suffers. This is in line with Busch and Reinhardt (2000) who argue that most utility is realized in the consultation phase.



## 8. Tables and figures

*Table 1: Overview of panel and CVM requests*

	<b>No panel</b>	<b>Panel</b>	<b>Total</b>
Implementation	236	130	366
CVMs	0	45	45

Table 2: Theoretical concepts and operationalization

	<b>Variable</b>	<b>Definition</b>
Utility Plaintiff (Implementation)	Developing Country Plaintiff ACWL	Dummy equal to 1 if plaintiff is a developing country Dummy equal to 1 if plaintiff involves the ACWL
Utility Plaintiff (CVMs)	Political Sensitive Sector  Primary Sector Developing Country Defendant  Trade Dependency  Experience	Dummy equal to 1 if dispute mentions a political sensitive agreement  Dummy equal to 1 if sector is low-velocity Dummy equal to 1 if defendant is a developing country  The percentage of exports from the defendant to the plaintiff over the total export of the defendant  Dummy equal to 1 when the plaintiff has dealt with CVMs before
Utility Defendant (CVMs)	Political Sensitive Sector  Primary Sector Trade Dependency  Experience  Multiple Plaintiffs	Dummy equal to 1 if dispute mentions a political sensitive agreement  Dummy equal to 1 if sector is low-velocity The percentage of exports from the defendant to the plaintiff over the total export of the defendant  Dummy equal to 1 when the plaintiff has dealt with CVMs before  Dummy equal to 1 when there is more than one plaintiff

Table 3: Summary Statistics

	<b>N</b>	<b>Mean</b>	<b>S. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Developing Plaintiff	411	0.423358	0.494693	0	1
ACWL Plaintiff	411	0.058394	0.234773	0	1
Political Sensitivity	411	0.218978	0.414058	0	1
Primary Sector	411	0.491484	0.500537	0	1
Developing Defendant	411	0.391728	0.488731	0	1
Trade Dependency	411	0.120298	0.158074	0.000158	0.885908
Experience Plaintiff	411	0.559611	0.497039	0	1
Experience Defendant	411	0.50365	0.500596	0	1
Multiple plaintiffs	411	0.082725	0.275802	0	1

Table 4: Regression results

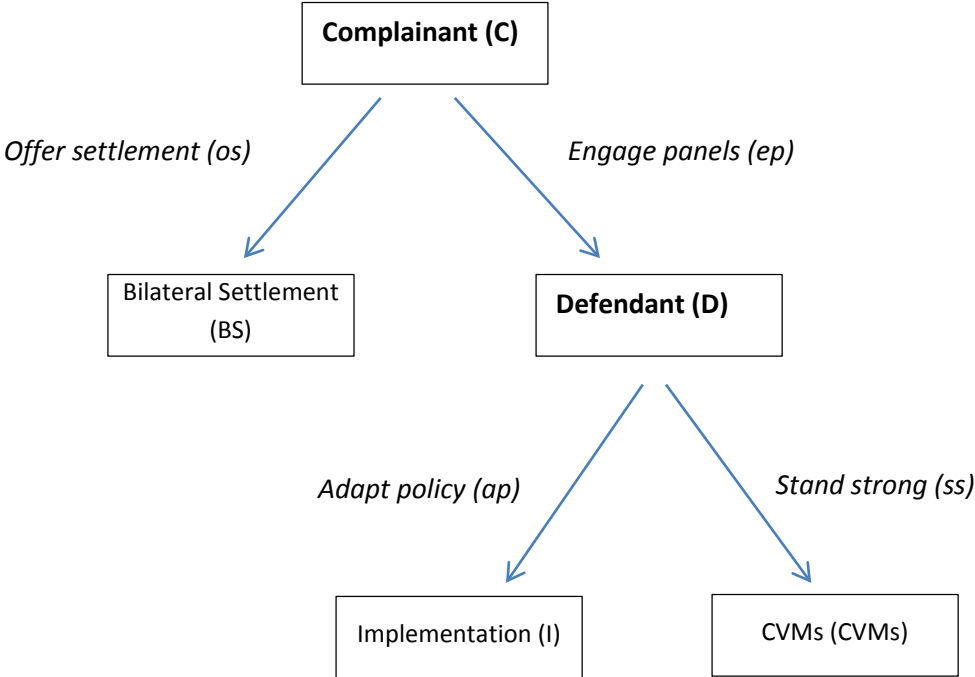
	(1) Implementation Phase	(2) Consultation Phase
Trade Dependency	1.553 (1.057)	0.748 (3.101)
Developing Country Defendant	-0.921* (0.473)	-4.620** (3.061)
Political Sensitive Sector	1.853*** (0.499)	-1.368 (0.840)
Experience Defendant	1.599** (0.533)	
Multiple Complainants	2.171*** (0.610)	
Primary Sector		-0.142 (0.711)
Developing Country Plaintiff		-0.573* (0.253)
Experience Plaintiff		1.463* (0.788)
ACWL		0.548 (0.561)
Constant	-2.899*** (0.580)	
Pseudo R <sup>2</sup>	0.229	
Observations	175	411
Sensitivity [Pr( + /D)]	46.67%	28.57%
Specificity [Pr( -/~D)]	93.08%	73.73%
Correctly Specified	81.14%	54.50%

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



Figure 1: Escalation at the WTO DSU as an extensive form game



## 9. References

- Bagwell, K. and Staiger, R.W. (2001). Domestic Policies, National Sovereignty, and International Economics Institutions, *The Quarterly Journal of Economics*, 116(2), pp. 519-562.
- Bagwell, K. Mavroidis, P.C., and Staiger, R.W.(2004). The Case for Tradable Remedies in WTO Dispute Settlement, Working Paper 3314, World Bank, Washington D.C.
- Bas, M.A., Signorino, C.S., and Walker, R.W. (2008). Statistical Backwards Induction: A Simple Method for Estimating Recursive Strategic Models, *Political Analysis*, 16(1), pp. 21-40.
- Bown, C.P. (2004). On the economic success of GATT/WTO dispute settlement, *The Review of Economics and Statistics*, 86(3), pp. 811-823
- Bown, C.P. (2004b). Developing Countries as Plaintiffs and Defendants in GATT/WTO Trade Disputes, *The World Economy*, 27(1), pp. 59-80.
- Bown, C.P. (2005). Participation in WTO dispute settlement: Complainants, Interested Parties, and Free Riders, *The World Bank Economic Review*, 19(2), pp. 287-310.
- Bown, C.P. and McCulloch, R. (2010). Developing countries, dispute settlement, and the Advisory Centre on WTO Law, *The Journal of International Trade and Development: An International and Comparative Review*, 19(1), pp. 33-63.
- Bush, M.L. and Reinhardt, E. (2000). Bargaining in the Shadow of the Law: Early Settlement in GATT/WTO disputes, *Fordham International Law Journal*, 24(1), pp. 158-172.
- Busch, M.L. and Reinhardt, E. (2003). Testing International Trade Law: Empirical Studies of GATT/WTO Dispute Settlement, in Kennedy, D.L.M. and Southwick, J.D. (eds.) *The Political Economy of International Trade Law: Essays in Honor of Rober E. Hudec*, Cambridge University Press.
- Busch, M.L. and Reinhardt, E. (2003b). Developing Countries and the General Agreement on Tariffs and Trade/ World Trade Organization Dispute Settlement, *Journal of World Trade*, 37(4), pp. 719-735.
- Busch, M.L. and Reinhardt, E. (2003). Developing Countries and GATT/WTO Dispute Settlement. *Journal of World Trade*, 37(4), 719-735

- Bush, M.L., Reinhardt, E. and Shaffer, G. (2009). Does Legal Capacity Matter? A survey of WTO members, *World Trade Policy*, 8(4), pp. 559-577.
- Crombez, C., Van Kerckhoven, S. and Van Gestel, W. (2011) Political Business Strategies and the Political Economy of Transatlantic Trade: Airbus and Boeing, *Review of Business and Economics*, 56(2), pp.224-243.
- Dam, K. (1970). *The GATT: Law and International Organization*. Chicago University Press.
- Davis, C.L. and Shirato, Y. (2007). Firms, Governments, and WTO Adjudication: Japan's Selection of WTO Disputes, *World Politics*, 59(1), pp. 274-313.
- Davis, C.L. and Blodgett Bermeo, S. (2009). Who Files? Developing Country Participation in GATT/WTO Adjudication, *The Journal of Politics*, 71(3), pp. 1033-1049.
- Guzman, A. and Simmons, B.A. (2002). To Settle or Empanel? An Empirical Analysis of Litigation and Settlement at the World Trade Organization, *Journal of Legal Studies*, 31(3), pp. 205-235
- Horn, H., Maggi, G. and Staiger, R. (2010). Trade Agreements as Endogenously Incomplete Contracts, *American Economic Review*, 100(1), pp. 394-419.
- Horn, H., Mavroidis, P. and Nördstrom, H. (1999). Is the use of the WTO Dispute Settlement System biased? CEPR Discussion Paper 2340.
- Horn, H. and Mavroidis, P. (2011). *WTO Dispute Settlement Database*, available at <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20804376~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>
- Maggi, G. and Staiger, R. (2011). The Role of Dispute Settlement Procedures in International Trade Agreements, *Quarterly Journal of Economics*, 126(1), pp. 475-515.
- McKelvey, R.D., and Palfrey, T.R. (1998). Quantal Response Equilibria for Extensive Form Games, *Experimental Economics*, 1(1), pp. 9-41.
- Reinhardt, E. (2001). Adjudication without Enforcement in GATT Disputes, *Journal of Conflict Resolution*, 45(2), pp. 174-195.

Sattler, T., Spiker, G. and Bernauer, T. (2014). Does WTO Dispute Settlement Enforce or Inform? *British Journal of Political Science*, 44(4), pp. 877-902.

Sevilla, C.R. (1999). Explaining Patterns of GATT/WTO Trade complaints, *Warhead Center for International Affairs*, Working Paper Series 98-01.

Signorino, C.S. (1999). Strategic Interaction and the statistical analysis of international conflict, *American Political Science Review*, 93(2), pp. 279-297

Signorino, C.S. (2003). Structure and Uncertainty in Discrete Choice Models, *Political Analysis*, 11(2), pp. 316-344.

Signorino, C.S. and Yilmaz, K. (2003). Strategic Misspecification in Regression Models, *American Journal of Political Science*, 47(3), pp. 551-566.

Trade and Development Center (1999). *Agreement Establishing the Advisory Centre on WTO Law*.

Van der Borght, K. (1999). The Advisory Center on WTO Law: Advancing Fairness and Equality, *Journal of International Economic Law*, 2, 723–28.

Van Kerckhoven, S. and Crombez, C. (2015). The WTO DSU: Are all (Un)equal? *MSI Research Report*

Yildirim, A. and De Bièvre, D. (2015). Leader or Laggard? Political Determinants of the EU's Compliance with WTO Dispute Settlement Rulings, *GGG Working Paper Series*, 145.

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<sup>i</sup> See <http://www.ictsd.org/bridges-news/bridges/news/argentina-trade-rows-escalate-at-wto>

<sup>ii</sup> For example, in the Bananas case, Santa Lucia needed to get outside counsel to represent its case (despite opposition of the EU/US, the WTO allowed Santa Lucia to do so). However, outside counsel is rather expensive.

<sup>iii</sup> There is a relatively large literature dealing with the WTO Dispute Settlement. This literature is grossly divided in 2 approaches. The first strand approaches the WTO dispute mechanism as an informational device. It builds upon the idea that the WTO agreements are incomplete contracts (Bagwell and Staiger, 2001; Horn, Maggi and Staiger, 2010, and Maggi and Staiger, 2011 among others). Within this approach, the WTO's dispute settlement works to interpret vague provisions within the agreement, and to provide guidance on issues on which the agreement remains silent. The second approach sees the WTO DSU as a market enforcing device. Within this approach, the WTO DSU works so as to enforce the provisions in the WTO agreements. Both of these approaches have led to some interesting results. Sattler, Spiker and Bernauer (2014) have empirically tested which of the two approaches so far seems to be supported by the WTO dispute settlement data. They find that the WTO DSU mostly works as an enforcement device, rather than a rule clarifying device. This paper mainly look into the enforcement of trade commitments.

<sup>iv</sup> See <http://www.eubusiness.com/news-eu/canada-wto-animals.8kb>

<sup>v</sup> See <http://www.theguardian.com/business/2003/oct/16/europeanunion>

<sup>vi</sup> We do not model the Appellate Body (AB) since the AB's role is to judicially review the panel ruling. As such, involving the AB does not directly add another escalation phase.

<sup>vii</sup> We base the division of developing/ developed country on the list of developing countries in the WTO. The WTO allows countries to self-select whether they want to be perceived as a developing country. In this paper, we decided to include all countries that self-selected to be a developing country to be a developing country.

<sup>viii</sup> Ideally, we could have included the cost of WTO litigation directly into our analysis. However, there is no data available on the cost of individual WTO disputes. Moreover, in the literature, there is still much discussion about the variables that can be considered as a proxy for this. This paper takes the view that the cost of WTO litigation is only part of the problems that face developing countries. We hence decided to use a dummy variable to capture the full extent to which developing countries might be at a disadvantage within the WTO DSU.

<sup>ix</sup> We had to delete a few observations, see 4.4.1.

<sup>x</sup> Bagwell, Mavroidis, and Staiger (2004) have presented an approach that might help countries to overcome the lack of retaliatory power.

<sup>xi</sup> Three years is not a fixed term in WTO law. If a panel is not composed within 3 years (which is far above all time limits in the WTO DSU), it is presumably because the parties have found a bilateral solution, but did not inform the WTO. After the panel has been involved, the whole process (including appellate review) should never exceed 18 months (WTO DSU Art.21.4). Parties will then get a reasonable (but limited) time to implement the findings. Taking a three years benchmark since the last activity in the dispute took place consequently is a reasonable and cautious benchmark and has also been used as a threshold by Guzman and Simmons (2002). Other authors (for example Bush and Reinhardt, 2003) abstract from all these cases, but this would result in a very limited number of observations.

<sup>xii</sup> Since the plaintiff has some knowledge about the defendant's pay-offs (see next section), we assume that if the plaintiff is willing to settle bilaterally, he will be able to draft a settlement offer that the defendant accepts.

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