



Discussion Paper 2011:3

Determinants of Bilateral Food Related Disputes

Christian Götz

*University of Bonn, Institute for Food and Resource Economics, Bonn, Germany
christian.goetz@ilr.uni-bonn.de*

Thomas Heckelei

*University of Bonn, Institute for Food and Resource Economics, Bonn, Germany
thomas.heckelei@ilr.uni-bonn.de*

The series "Agricultural and Resource Economics, Discussion Paper" contains preliminary manuscripts which are not (yet) published in professional journals, but have been subjected to an internal review. Comments and criticisms are welcome and should be sent to the author(s) directly. All citations need to be cleared with the corresponding author or the editor.

Editor: Thomas Heckelei
Institute for Agricultural Policy, Market Research
and Economic Sociology, University of Bonn
Nußallee 21
53115 Bonn, Germany

Phone: +49-228-732332
Fax: +49-228-734693
E-mail: heckelei@agp.uni-bonn.de

Determinants of Bilateral Food Related Disputes

Christian Götz, Thomas Heckelei

Abstract

This paper analyses relevant determinants for the probability to initiate a dispute on policy measures under the World Trade Organization (WTO) Dispute Settlement Mechanism (DSM). The empirical analysis focuses on agro-food related disputes to provide sector specific information on the driving factors in dispute settlement, and complements and extends previous studies by incorporating new potential determinants. The focus is shifted to bilaterally dependent characteristics to take care of trade related and power based relationships between Members, such as relevance of the defendant's market and the complainant's trade related retaliation capacity. Contrary to recent analyses of overall trade disputes, the results show that capacity-related determinants such as financial means and legal capacity and simple trade-related characteristics like export and import volume do not show a statistically significant impact on dispute initiation in the agro-food sector. However, the level of protectionism that Members face in their export markets, their operating experience with the DSM, the influence of private sector interests, complainants' agro-food related export dependency as well as the size of their agro-food imports from the defendant party could be identified as relevant determinants of dispute initiation behavior.

Keywords: WTO dispute, Agro-food sector, Binary choice model, Weighted Endogenous Sampling Maximum Likelihood (WESML) estimator

JEL-classification: C12, C13, C25, Q17, Q18.

1 Introduction

Negotiations on improvements of the WTO dispute settlement mechanism (DSM) are going on since 1997, but seem far from completion. The major objectives are to make the system more effective and to allow equal access to all different types of Members. The system's Member-driven nature determines the conditions of its use, i.e. it creates incentives that are both market driven and related to Members' resource endowments and constraints. This investigation aims at identifying relevant countries' characteristics having an impact on the probability to observe a bilateral dispute between them. Information on the factors explaining Members' involvement in or absence from the system could help rationalizing the reform discussion. The empirical analysis focuses on agro-food-related disputes to provide sector-specific information on the driving factors in dispute settlement. This

paper builds upon GÖTZ ET AL. (2010) shifting the focus to bilaterally relevant issues in disputes. Previous empirical studies are complemented by incorporating new potential trade-related determinants and bilaterally dependent market and power based relationships.

This paper is organized as follows: After depicting the motivation for the shift to a purely bilateral approach with reference to previous empirical findings, the model specification and estimation approach are described. This is followed by a brief description of the unilateral variables used in GÖTZ ET AL. (2010) and the discussion of the newly introduced bilateral determinants. Statistical implementation and estimation results are subsequently presented before concluding.

2 Motivation for a bilateral approach

Like most empirical studies on the subject GÖTZ ET AL. (2010) have taken a non-bilateral approach and thereby mainly addressed capacity and aggregate sector related characteristics of Members that are likely to come into play in a WTO dispute. Capacity related determinants are unilateral in nature, like Members' endowment with financial means, legal capacity, administrative power and operating experience with the system. They play a major role in the pre-litigation phase for monitoring trade issues, gathering information and communication with the private sector and during the course of a panel process to prepare a strong case and to effectively engage in the panel procedure.

Their influence on Members' use of the system and also their success in disputes has been stressed and substantiated by several empirical studies. The positive influence of Members' financial means in terms of GDP has been shown by BOWN (2005a) and DAVIS AND BERMEO (2009). BESSON AND MEHDI (2004) have demonstrated that legal capacity measured as their delegation size in Geneva increases countries' likelihood of success in disputes. GÖTZ ET AL. (2010) and DAVIS AND BERMEO (2009) have provided empirical evidence on the positive influence of Members' operating experience with the system on their probability to file disputes. The relevance of Members' experience with democratic governance has been emphasized and supported by BUSCH (2000), BUSCH AND REINHARDT (2000) and DAVIS AND BERMEO (2009). It can be interpreted as their general ability to effectively use legalized and rules-based systems like the DSM.

However, it is at the compliance stage after a successful panel ruling where bilaterally dependent issues play a major role for enforcement. The importance of the complainant party's trade-related retaliatory capacity has been emphasized

and its positive influence been substantiated by several studies (see e.g. BOWN 2005a, 2005b, and BUSCH AND REINHARDT 2000). Also, political economy linkages between complainant and defendant like preferential trade access and bilateral economic aid may show an effect on Members' initiation decision. This has been supported by BESSON AND MEHDI (2004) for countries' success in litigation and by BOWN (2005a) for their decision to engage as co-complainants or interested third party in disputes. In addition, it is worthwhile to complement aggregate market-related interests with more specific information connected to the trade relationship between the parties to the dispute. In this context, BOWN (2005a) has demonstrated that the size of affected exports and the defendant market's export relevance to the complainant influence its decision to file a dispute.

Such bilateral attributes reflect the characteristics of the trade relationship and economic linkages between the parties. For instance, Members' retaliatory capacity is not a general feature in the DSM context but dependent on their relevance as trade partner for individual defendants. The merits of a bilateral analysis are also evident in respect of characteristics of the affected sector or market. Sector related trade between complainant and defendant may reveal information on the trade issue that cannot be captured by unilateral indicators. In general, more selective indicators allow for a more precise assessment of influences.

3 A bilaterally dependent dispute initiation model and estimation approach

This analysis is based on the model developed by HORN ET AL. (1999) and applied by GÖTZ ET AL. (2010) to agro-food trade disputes. It is modified here to capture also characteristics that differ for each bilateral trade relationship. The dispute initiation decision is described through a binary choice model in which a Member's probability to complain against another Member depends on a set of the complainant's traits or the characteristics of its specific environment and on the trade-related and power-based relationship between complainant and defendant. The implicated conditional probability function for this binary choice situation is the Bernoulli distribution

$$F(y_{ij0} | \mathbf{x}_{ij}, \boldsymbol{\beta}) = \pi_{ij}(\mathbf{x}_{ij}, \boldsymbol{\beta})^{y_{ij0}} [1 - \pi_{ij}(\mathbf{x}_{ij}, \boldsymbol{\beta})]^{1 - y_{ij0}} = \begin{cases} \pi_{ij}(\mathbf{x}_{ij}, \boldsymbol{\beta}) & \text{for } y_{ij0} = 1, \\ 1 - \pi_{ij}(\mathbf{x}_{ij}, \boldsymbol{\beta}) & \text{for } y_{ij0} = 0. \end{cases} \quad (0.1)$$

where y_{ij_o} is the binary dependent variable which takes 1 for a complaint and 0 for no complaint, i and j indicate the complainant and the defendant respectively and o refers to the observation, i.e. a certain dispute initiation decision, \mathbf{x}_{ij} is the vector of K determinants and $\boldsymbol{\beta}$ denotes the vector of K corresponding coefficients. Function $\pi_{ij}(\mathbf{x}_{ij}\boldsymbol{\beta})$ calculates the individual probability to complain for a potential complainant i against a potential defendant j which can be represented by any cumulative probability distribution function. Here, we use the widely employed conditional logistic distribution,

$$\pi_{ij}(\mathbf{x}_{ij}\boldsymbol{\beta}) = \frac{\exp(\mathbf{x}_{ij}\boldsymbol{\beta})}{1 + \exp(\mathbf{x}_{ij}\boldsymbol{\beta})}, \quad (0.2)$$

resulting in the bilaterally dependent Logit model of agro-food related dispute initiations. Note that equations (3.1) and (3.2) are the same as the first two equations in Götz et al. 2010 except that variables and probabilities are double indexed by i and j and not only by i .

Observations or binary choice situations are defined as bilateral agro-food related trade flows from the potential complainant to the potential defendant Member. The proceeding for the assessment of determinants is the reproduction of the observed sample of dispute initiations over the period from January 1, 1995 to December 31, 2005. Due to the limited number of disputes in bilateral relationships, efficient estimation requires application of the weighted endogenous sampling maximum likelihood estimator developed by MANSKI and LERMAN (1977). Observations with $y = 1$ were oversampled to enrich the skewed original sample. The resulting sample selection bias is then mitigated in the estimation process by weighting the likelihood contributions based on their proportion in the enriched sample in relation to their true proportion in the population. Under the assumption of independent and identically distributed observations the log-likelihood function is given as

$$\ln L(\boldsymbol{\beta} | \mathbf{x}_{ij}; n_{ij}, c_{ij}) = w_1 \sum_{i,j;i \neq j} c_{ij} \ln \pi_{ij}(\mathbf{x}_{ij}\boldsymbol{\beta}) + w_0 \sum_{i,j;i \neq j} (n_{ij} - c_{ij}) \ln \pi_{ij}(-\mathbf{x}_{ij}\boldsymbol{\beta}), \quad (0.3)$$

where $c_{ij} = \sum_o y_{ij_o}$, n_{ij} is the number of bilateral agro-food related observations for the bilateral relationship between Member i and Member j , $w_1 = Q_1 / H_1$ and $w_0 = Q_0 / H_0$ are the weighting factors for the single likelihood contributions of observations on $y = 1$ and $y = 0$ respectively, Q_1 and Q_0 are the population proportions, and H_1 and H_0 are the enriched sample proportions of $\sum c_{ij}$ and of $\sum (n_{ij} - c_{ij})$ respectively.

The expected number of Member i 's complaints against Member j is then given by the expected value of the sample of observations,

$$E(c_{ij}) = n_{ij} \pi_{ij}(\mathbf{x}_{ij} \boldsymbol{\beta}), \quad (0.4)$$

which is strictly proportional to the number of observed bilateral trade flows n_{ij} . Similarly to the non-bilateral case in GÖTZ ET AL. (2010), the number of independent Bernoulli trials for each Member combination requires information about the exact number of infringements that each Member faces in its trade relationship with potential defendants, as the aforementioned binary choice model refers to the litigation decision when WTO obligations are violated. Since we have no a priori information about the existence of inconsistent trade measures, the analysis is based on the assumption that they are uniformly distributed across export flows. We cannot separately identify the determinants for the incidence of trade infringements and their influence on Members' probability to file disputes. Following GÖTZ ET AL. (2010) we mitigate the problem of missing information about the distribution of infringements by incorporating the indicators *Endured protectionism* and *Own imposed protectionism*. Likewise, the compilation of bilateral export flows between Member combinations is due to a value threshold defined by empirical estimates of induced litigation costs. The number of independent Bernoulli trials n_{ij} is then defined as the yearly average of different agro-food related export flows over the investigation period sent from the complainant's to the defendant's market.

4 Determinants considered

Deviating from most existing studies but similar to GÖTZ ET AL. (2010), this paper focuses specifically on agricultural and food-related disputes. This sector focused approach provides the basis for testing more precise hypotheses and especially the newly introduced bilaterally dependent determinants are sector specific. Due to limited data availability for some determinants under investigation the sample is limited to 53 Members while maintaining the distribution over income classes according to The World Bank atlas method¹.

Differing from GÖTZ ET AL. (2010), the data on disputes, on trade flows and on all trade related indicators (*Agro-food export value*, *Agro-food import value*, *Agro-food export dependency from defendant*, *Agro-food import dependency from defendant* and *Agro-food related trade retaliatory capacity*) are varying with the bilateral relationship considered.

Table 3.1 provides an overview on all explanatory variables grouped as unilaterally and bilaterally dependent with their respective data source and expected

¹ Income classes are: low income, \$1,005 or less; lower middle income, \$1,006 - \$3,975; upper middle income, \$3,976 - \$12,275; and high income, \$12,276 or more. Available online at: <http://data.worldbank.org/about/country-classifications>, 2011-10-04.

impact on the initiation of disputes. The unilateral control variables have already been incorporated in GÖTZ ET AL. (2010) and the bilateral control variables are newly introduced.

Table 4.1: Survey on explanatory variables, data and expected sign

Type of variable	Explanatory variables	Data	Source	Expected sign
Unilateral control variables	Endured protectionism	Average endured tariff equivalent	Kee, Nicita, Olarreaga (2006)	+
	Own imposed protectionism	Average imposed tariff equivalent	Kee, Nicita, Olarreaga (2006)	-
	Legal capacity	Size of permanent delegation at Geneva	United Nations (2004)	+
	Capacity to absorb legal costs/wealth	Gross Domestic Product (GDP)	World Bank (2007)	+
	Governmental efficiency	Measure of effectiveness and integrity of the legal and judicial system	Kaufmann (2004)	+
	Influence of private actors	Measure of legal dimensions of undue political influence by the private sector	Kaufmann (2004)	+
	Importance of agro-food sector	Share of agro-food related export value in GDP	World Bank (2007)	+
	WTO membership time	Index based on a member's percentage membership time over investigation period	World Trade Organization (2007)	+
Bilateral control variables	Agro-food export value	Complainant's total agro-food export value to defendant	EuroCare (2006)	+
	Agro-food import value	Complainant's total agro-food import value from defendant	EuroCare (2006)	-/+
	Agro-food export dependency from defendant	Share of complainant's agro-food export value to defendant in complainant's total agro-food exports	EuroCare (2006)	+
	Agro-food import dependency from defendant	Share of complainant's agro-food imports from defendant in complainant's total agro-food imports	EuroCare (2006)	-/+
	Agro-food trade retaliatory capacity	Share of defendant's agro-food exports to complainant in defendant's total agro-food exports	EuroCare (2006)	+

Source: Own compilation

4.1 Unilateral variables

It follows a condensed description of the unilateral variables and related data that are taken from GÖTZ ET AL. (2010). The set of unilateral country characteristics is reflected by *Induced costs of litigation*, Members' *Legal capacity*, their *Capacity to absorb litigation costs/wealth*, *Governmental efficiency*, the *Influence of private actors*, the *Importance of the agro-food sector*, their *Endured protectionism* and *Own imposed protectionism*, and their *WTO membership time*. For their motivation and related hypotheses please see GÖTZ ET AL. (2010).

Induced costs of litigation

To account for *Induced costs of litigation*, bilateral trade flows between Member combinations are compiled based on value thresholds. Following GÖTZ ET AL. (2010) export flows are counted based on average litigation costs of WTO cases of different complexity as calculated by NORDSTRÖM (2005). Likewise, the analysis is conducted for four different litigation cost levels, i.e. excluding all flows below the respective threshold: \$0 when no threshold is applied, \$300K for low costs, \$500K for medium costs and \$700K for high litigation costs. The rationale behind this is to account for fixed costs of litigation. Put differently, it is hypothesized that trade flows have to exceed a certain threshold to be considered worth enough to justify costly WTO adjudication.

Legal capacity

As in GÖTZ ET AL. (2010), Members' size of standing delegation in Geneva in 2004 is used as proxy for their overall *Legal capacity* connected to WTO adjudication. *Legal capacity* is required to effectively participate in the panel procedure and for countries' general ability to process trade issues under the WTO. The data stems from UNITED NATIONS (2004).

Capacity to absorb litigation costs/wealth

As proxy for Members' *Capacity to absorb litigation costs/wealth* their GDP in US-Dollars, provided by the WORLD BANK (2007) is used. It may be interpreted as substitutive factor for *Legal capacity* and also as a measure of Members' overall freedom to engage in their trade issues. The indicator is an average of Members' yearly reported GDP over the investigation period.

Governmental efficiency and Influence of private actors

To account for Members' *Governmental efficiency* related to processing WTO trade issues the 'Judicial/Legal Effectiveness Integrity Index (JLEI)' is incorporated. It assesses the effectiveness and integrity of countries' legal and judicial system. It may be interpreted as the processing ability of their administrative

structures that play an important role especially at the pre-litigation phase of disputes for gathering and exploitation of information on trade issues and communication with the private sector.

The *Influence of private actors* on governmental decisions in the DSM context is measured by the 'Corporate Legal Corruption Component (CLCC)', measuring legal dimensions of undue political influence by the private sector. It provides information on the private sector's ability to communicate its interests and petition the government, which is important as only governments have legal standing at the WTO. Both indicators are provided by KAUFMANN (2004).

Importance of the agro-food sector

The *Importance of the agro-food sector* for their economies is measured as the share of Members' agro-food related export value in their GDP. The data comes from the WORLD BANK (2007). The indicator represents an average over the investigation period.

Endured protectionism and Own imposed protectionism

Members' faced level of protectionism is measured by the Market Access Overall Trade Restrictiveness Index (MA-OTRI) provided by KEE ET AL. (2006). It comprises a tariff equivalent of all barriers in the agro-food sector that exporters of the respective country face on average across trade partners and commodities. The indicator refers to data stemming from 1995-1998 concerning the non-tariff component and from 2000-2004 for the tariff component of the aggregated MA-OTRI.

The indicator on Members' Own imposed protectionism is intended to capture aspects of strategic behavior in the DSM context and to account for Members' overall inclination towards the WTO's objective of free trade. It is a tariff equivalent of all trade barriers in the agro-food sector which the respective country imposes in average upon the rest of the world. It provides the mirror image of the aforementioned MA-OTRI indicator, measuring the trade restrictiveness from the potential complainant's perspective and refers to the same period of measurement.

WTO membership time

To account for Members' operating experience with the DSM, the approach of GÖTZ ET AL. (2010) is followed by creating an index over the time since the inception of the organization until the end of the investigation period, relating each Member's membership time to the whole observation period. The associated data is from WTO (2007).

4.2 Bilateral variables

In the following the compilation of disputes, of trade flows and the newly introduced bilaterally dependent characteristics are motivated and described together with the data used. Disputes are the dependent variable in the estimation. Bilateral trade flows are not control variables but the foundation of the binary choice model, i.e. the observations or the binary choice situations. Data on bilateral trade flows come from EURO CARE (2006) available at HS-4-level. In contrast to GÖTZ ET AL. (2010) trade flows are purely bilateral, i.e. refer to the trade relationship between potential complainant and defendant Member.

Disputes data

Dispute initiations were collected that affected products of the agricultural and food sector. The investigation period is from January 1, 1995, to December 31, 2005, thereby slightly shortened compared to GÖTZ ET AL. (2010) to make the compilation of disputes consistent with the data on trade. The modus operandi for counting disputes is identical to GÖTZ ET AL. (2010): initiations are counted once excluding re-uptakes of disputes, jointly filed initiations are assigned each participant, filings on the same trade issue but with different Members are separately counted and for disputes of as well as against European Community (EC) Members there is one dispute assigned the EC, as complainant in the first and as defendant in the latter case. The data on disputes stem from WTO (2011).

Agro-food related trade retaliatory capacity

Members' trade retaliatory power is seen as especially relevant for the compliance phase after a pro-complainant ruling by the panel or Appellate body. The self-enforcing nature of the DSM charges the complainant with the enforcement of compliance. If the defendant refuses to bring its trade regime into account with its WTO obligations, the complainant party may be entitled to impose penalty tariffs on imports from the defendant party. Although retaliation may also be entitled under other agreements the level of imports in the affected sector is supposed to reveal information about the complainant's overall trade retaliation capacity. However, this retaliatory threat is only credible if the defendant's exports to the complainant's market accounts for a substantial amount in its total exports. The

complainant's trade retaliatory power is measured as the defendant's share of agro-food export value to the complainant in the defendant's total agro-food export value. The data on trade flows and value come from EURO CARE (2006).

Agro-food export value to defendant

To complement the unilateral indicator *Importance of the agro-food sector* Members' aggregate agro-food related exports to the defendant's market is incorporated. The indicator provides an average over the investigation period. It is assumed that the overall export value provides information on the relevance of agro-food trade of the respective trade relationship between complainant and defendant. Hence, the aggregate export value is supposed to show a positive impact on complainant parties' dispute initiation probability. The data on Members' trade volume is from EURO CARE (2006).

Agro-food import value from defendant

The volume of imports from the potential defendant's market may reflect two different aspects of the relationship between complainant and defendant. First, the larger the volume of trade sent from the defendant to the complainant's market, the higher may the complainant's opportunities for trade retaliation be with respect to the defendant's market. Second, the volume of imports may be interpreted to incorporate information about intra-industry trade or agro-food products for consumption. A high volume of trade sent from the defendant to the complainant may thereby be associated with a dependency of the complainant's on the defendant's market, either for its industry or its domestic consumption. This makes effective retaliation through penalty tariffs less likely. Hence, the complainant's import value may show a positive or a negative influence. The indicator is compiled as an average over the investigation period and the data is taken from EURO CARE (2006).

Export dependency and Import dependency from defendant

Both indicators show the defendant's relevance as trade partner. A complainant party's agro-food export sector might be more or less dependent on the defendant party's market. It is hypothesized that Members' export sector is more dependent on the defendant's market, the more they export to this market in relation to their overall agro-food exports. Hence, Members' stronger *Export dependency* on certain trade partners is assumed to show a positive influence on their probability to complain against those partners.

Members' *Import dependency* might show a positive or a negative influence. The more they import from certain partners relative to their overall imports the more dependent their import sector from those partners. This *Import dependency* might have a negative impact on their ability to impose retaliation measures against those partners for the reason that they just cannot afford to cut off the affected imports. From this follows that *Import dependency* might show a negative impact on their decision to initiate disputes against their respective partners because their dependency makes potential retaliation measures and thereby also the successful accomplishment of the dispute unlikely. On the other hand a high *Import dependency* may imply a substantial amount of imports from the respective defendant, suggesting a high retaliation capacity. Hence, the indicator on *Import dependency* might capture the aspect of trade retaliatory power and thereby could show a positive influence on Members' probability to complain against the respective partners.

Export dependency is measured as the share of complainants' agro-food export value to the defendant's market in complainants' overall agro-food export value. Members' *Import dependency* is measured as the share of complainants' agro-food import value from the defendant's market in complainants' overall agro-food import value. The data on trade flows and values stem from EURO CARE (2006).

5 Statistical Implementation and Results

The selection of relevant variables is based on the Akaike information criterion. This procedure trades off the inclusion of additional variables against the increased fit of the model. Incorporating additional explanatory variables improves the goodness of fit regardless of the number of free parameters in the data generating process. The increased complexity is penalized by the Akaike indicator thereby mitigating the danger of over-fitting. The preferred model specification is that one showing the lowest information criterion value. All different model specifications are evaluated, i.e. all specifications are estimated and their corresponding information criterion value calculated. A test on joint significant influence is conducted for the best specification under each value threshold on export flows, i.e. that one yielding the lowest information criterion value. Variables' joint significant influence is verified by an asymptotic significance test based on the bootstrapped sampling distribution of the estimator (see EFRON AND TIBSHIRANI 1994). The quality of the model is further on validated by a likelihood ratio test. In this process the logarithmic likelihood function value of the unconstrained ML estimator $\hat{\beta}$, is compared with the log-likelihood function value of the constrained ML estimator $\tilde{\beta}$, which is obtained by maximizing the logarithmic likelihood function subject to the linear restrictions $\tilde{\beta}_k = 0 \forall k \neq 0$. The LR test statistic is computed as

$$LRTS = 2 \left[\ln L(\hat{\beta} | \mathbf{x}_{ij}; c_{ij}, n_{ij}) - \ln L(\tilde{\beta} | c_{ij}, n_{ij}) \right], \quad (0.5)$$

which has a Chi-squared distribution with degrees of freedom equal to the number of imposed restrictions.²

According to this proceeding six of the considered determinants are retained in the final specifications: (1) *Endured protectionism*, (2) *Own imposed protectionism*, (3) *Influence of private actors*, (4) *WTO membership time*, (5) *Agro-food import value*, and (6) *Agro-food export dependency* from defendant result in a sufficient increase in the goodness of fit. However, their selection changes dependent on the imposed threshold. For the application of the \$0 threshold the (3) *Influence of private actors*, (4) *Operating experience*, (5) *Agro-food import value*, and (6) *Agro-food export dependency* are selected, under the \$500K and the \$700K thresholds the (3) *Influence of private actors*, and (6) *Agro-food export dependency*, and for the \$300K threshold Members' (2) *Own imposed protectionism* are additionally discarded in the variable selection process. The (3) *Influence of private actors* is only selected when no threshold on export flows is applied in their compilation. Table 3.2 comprises the results for the selected specifications of the unrestricted model subject to different thresholds on export flows. The standard errors are given in brackets behind the respective coefficients. All variables show their expected sign and except for the variable (2) *Own imposed protectionism* are shown to be statistically significant. The indicator (5) *Agro-food import value* turned out to show a positive impact on Members' likelihood to file cases, as expected under the trade retaliation related hypothesis.

² Estimation, selection of variables, the likelihood ratio test and the testing procedure are implemented in GAMS (General Algebraic Modeling System), see BROOKE, A., KENDRICK, D., MEERAUS, A. AND R. RAMAN (1998): *GAMS - A USER'S GUIDE*, WASHINGTON, D.C. Standard errors of the coefficients are calculated for 2000 re-sampling iterations. The bootstrap re-sampling procedure is conducted in GAUSSTM, see <http://www.aptech.com/>, 2011-04-17.

Table 5.1: Results for specification selections subject to different thresholds on export flows

Exploratory variables	Threshold on export value			
	\$0	\$300K	\$500K	\$700K
BETA 0	-14,025	-12,078	-11,811	-11,643
	not	2.150***	2.196***	2.269***
Endured protectionism	included	(0.89)	(0.92)	(0.87)
Own imposed protectionism	not	not	- 0.516	- 0.511
	included	included	(0.66)	(0.66)
Influence of private actors	0.734***	not	not	not
	(0.31)	included	included	included
WTO membership time	3.923*	3.754*	3.887**	3.864**
	(2.67)	(2.47)	(2.09)	(2.31)
Agro-food Export dependency	0.972**	not	not	not
	(0.47)	included	included	included
Agro-food import value from defendant	2.652***	1.384***	1.108***	0.981***
	(0.21)	(0.33)	(0.30)	(0.35)

* Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level

Level of significance for Likelihood ratio test on model specification: 1% under all thresholds.

Source: Own compilation.

The likelihood ratio test proves a significant amendment of the model based on the incorporation of the addressed determinants. For all thresholds the concerned variables' joint contribution could be substantiated at the 1% level.

As hypothesized Members facing higher levels of protectionism in their agro-food trade relations show a higher probability to file agro-food related disputes. This is in accord with the objectives of the system where we would expect that more protectionist policy measures are likely to trigger arbitration about them. Demonstrated as relevant influence in the empirical study of GÖTZ ET AL. (2010) and even though selected with the hypothesized sign the impact of Members' own tendency towards protectionist policies could not be substantiated in this bilateral context.

Supporting the arguments of SHAFFER (2003a, 2003b) and HOEKMAN AND MAVROIDIS (2000) on the relevance of private lobbying activities during the pre-litigation stage, the influencing power of private sector interest is demonstrated. However, the respective control variable is only included under the lowest threshold. This suggests that when higher valued trade stakes are involved lobbying activities are of minor relevance in governments' decisions on adjudication. Put differently, lower expected gains from disputed trade may require higher lobbying efforts to prompt governments to pursue a costly WTO dispute.

Confirming the findings of DAVIS and BERMEO (2009) and GÖTZ ET AL. (2010), Members' operating experience clearly shows a significant impact under all thresholds on export value. This may be due to its fixed cost decreasing influ-

ence as emphasized by DAVIS AND BERMEO (2009) and GÖTZ ET AL. (2010) and increased efficiency in processing disputes through learning.

Members' *Agro-food export dependency* has a significant positive impact, confirming the relevance of the trade relationship with the defendant, i.e. the relevance of the disputed market in the decision to file a case. Although the more selective indicator on *Agro-food related trade retaliation capacity* does not turn out to show an influence on variation in disputes, Members' *Agro-food import value* from the defendant is selected with positive sign under all thresholds and significant. Hence, the higher volume of trade that goes to complainants' markets from defendants is not decisively reflected in their overall agro-food related importance to defendants. However, the positive influence of the absolute market-related import value may imply that Members have the potential to impose a critical damage to the defendant's market. On the other hand, Members' import value might be connected to the issue of import-competition. In this case the indicator may reflect the value of prospective gains for domestic import-competing firms suggesting an incentive for related disputes. However, a more precise assessment of this potential issue would require a more detailed and case study based analysis incorporating information on the subject of the dispute and on affected firms and trade flows.

The *Importance of Members' agro-food export sector* could not be supported. This may reflect that agro-food exports play a minor role in the economy of the most active users of the system, e.g. the U.S. and the EC. As in GÖTZ ET AL. (2010) the influence of Members' *Capacity to absorb legal costs/wealth* and their *Governmental efficiency* could not be substantiated. Also, their *Agro-food export value* to and their *Agro-food import dependency* from the defendant could not be demonstrated to show an influence.

6 Conclusions

This paper presented an analysis of the determinants for initiating WTO disputes related to the agro-food sector. The investigation built upon on the analysis of GÖTZ ET AL. (2010) but shifted the focus to bilaterally dependent Member characteristics that are connected to their trade relationships. Bilateral indicators reflect Members' relevance as trade partner to each other and are especially relevant for enforcement of compliance, like the complainant's trade related retaliatory capacity and its dependency on the defendant's market. Unilateral characteristics taken from GÖTZ ET AL. (2010) were also tested. The empirical model representing Members dispute initiation decision as Bernoulli trials – with probabilities modeled by a logistic distribution – was applied to 53 WTO Member countries. The bilateral approach involved an estimation problem related to a skewed sample in terms of few bilateral WTO disputes in contrast to the huge

number of trade flows as observations. To allow for an efficient estimation the Weighted Endogenous Sampling Maximum Likelihood (WESML) estimator developed by MANSKI AND LERMAN (1977) was applied.

The results show that some of the determinants relevant in previous dispute studies such as financial means and legal capacity could not be confirmed as statistically relevant in the context of the agro-food sector. Also, the influence of simple trade related characteristics like export and import value in the sector could not be substantiated. It could be shown that the level of faced protectionism, the relevance of private sector influences in their economy, and their operating experience with the DSM significantly increase Members' likelihood to file complaints. Regarding bilaterally dependent trade characteristics, the positive impact of Members' Agro-food export dependency and their Agro-food import value from the defendant on their initiation probability is empirically supported. Their influence can be motivated as showing the defendant's relevance as trade partner for the complainant and the complaint's capacity to threaten retaliation with respect to the defendant's market, respectively.

Further research should focus on the improvement of data quality to validate or disprove the findings on insignificant influences of some variables, for example on Members' overall dispute processing and administrative capacity. A more selective measurement of Members' trade related retaliatory capacity, which is relevant for enforcement, might contribute to a better understanding of this issue in trade disputes.

7 References

- BESSON, F. AND R. MEHDI (2004): Is WTO Dispute Settlement Biased Against Developing Countries? An Empirical Analysis. Paper presented at the Second International Conference on "European and International Political and Economic Affairs", Athens, Greece, May 27–29.
- BOWN, C.P. (2005a): Participation in WTO Dispute Settlement: Complainants, Interested Parties, and Free Riders. *The World Bank Economic Review* 19 (2), pp. 287–310.
- BOWN, C.P. (2005b): Trade Remedies and WTO Dispute Settlement: Why Are So Few Challenged? *Journal of Legal Studies* 34 (2), pp. 515–555.
- BROOKE, A., KENDRICK, D., MEERAUS, A. AND R. RAMAN (1998): GAMS - A User's Guide, Washington, D.C., Available online at: <http://www.gams.com>, 2011-10-13.
- BUSCH, M.L. (2000): Democracy, Consultation, and the Paneling of Disputes under GATT. *The Journal of Conflict Resolution* 44 (4), pp. 425–446.
- BUSCH, M.L. AND E. REINHARDT (2000): Bargaining in the Shadow of the Law. Early Settlement in GATT/WTO Disputes. *Fordham International Law Journal* 24 (1), pp. 158–172.

- DAVIS, C.L. AND S.B. BERMEO (2009): Who Files? Developing Country Participation in WTO Adjudication. *The Journal of Politics* 71 (3), pp. 1033–1049.
- EFRON, B., TIBSHIRANI R. J. (1993): *An Introduction to the Bootstrap*. Boca Raton: Chapman and Hall/CRC Press LLC, 1.ed., 456p.
- EUROCARE (2006): Consolidating Bilateral Trade Quantities and Values for Agricultural Trade Based on an HPD Estimator. Internal Working Paper, Institute for Food and Resource Economics, University of Bonn.
- GÖTZ, C., HECKELEI, T. AND B. RUDLOFF (2010): What makes countries initiate WTO disputes on food-related issues? *Food Policy* 35 (2), pp. 154–162.
- HOEKMAN, B.M. AND P.C. MAVROIDIS (2000): WTO Dispute Settlement, Transparency and Surveillance. *The World Economy* 23 (4), pp. 527–542.
- HORN, H., MAVROIDIS, P.C. AND H. Nordström (1999): Is the Use of the WTO Dispute Settlement System Biased? Center for Economic Policy Research Discussion Paper, No. 2340.
- KAUFMANN, D. (2004): Corruption, Governance and Security: Challenges for the Rich Countries and the World. In: World Bank Group (Ed.): *Global Competitiveness Report 2004/2005*, pp. 83-102.
- KEE, H.L., NICITA, A. AND M. OLARREAGA (2006): Estimating Trade Restrictiveness Indices. World Bank Policy Research Working Paper, No. 3840.
- MANSKI, C.F. AND S.R. LERMAN (1977): The Estimation of Choice Probabilities from Choice Based Samples. *Econometrica* 45 (8), 1977–1988.
- NORDSTRÖM, H. (2005): The Cost of WTO Litigation, Legal Aid and Small Claim Procedures. Working Paper, Stockholm.
- SHAFFER, G.C. (2003a): How to Make the WTO Dispute Settlement System Work for Developing Countries. International Centre for Trade and Sustainable Development Resource Paper, No. 5.
- SHAFFER, G.C. (2003b): *Defending Interests. Public-Private Partnerships in WTO Litigation*. Washington, D.C.: Brookings Institution Press, 160p.
- UNITED NATIONS (2004): Missions Permanentes Au près Des Nations Unies À Genève. Directory service and telephone directory of the United Nations, No. 94.
- World Bank (2007): World Bank development indicator database 2007, Available online at: <http://www.worldbank.org/>, 2011-10-15.
- WORLD TRADE ORGANIZATION (2007): Understanding the WTO: The Organization. Members and Observers. Available online at: http://www.wto.org/English/thewto_e/whatis_e/tif_e/org6_e.htm, 2011-04-15.
- WORLD TRADE ORGANIZATION (2011): Dispute Settlement Gateway. Available online at: http://www.wto.org/english/tratop_e/dispu_e/dispu_e.htm, 2011-04-