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ABSTRACT

Is The Use Of The WTO Dispute Settlement System Biased?*

The larger trading nations have been the main users of the WTO Dispute Settlement system during its first four years of existence (1995-1998). This has prompted a debate about whether the DS system is biased against smaller and poorer countries, for example, because of a lack of legal capacities and retaliatory power. This paper shows that a simple model in which countries bring disputes proportionally to the diversity and value of exports explains fairly well the dispute pattern. Differences in legal capacities appear to play some role, while 'power' considerations do not seem to matter.

JEL Classification: F02, F13 and K33
Keywords: dispute settlement and wto

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Submitted 29 November 1999

NON-TECHNICAL SUMMARY

The Dispute Settlement (DS) system of the World Trade Organization (WTO) has been in place since 1 January 1995. High hopes have been attached to the system, in particular with regard to the protection it has been expected to afford to the interests of the smaller Member countries of the organization. For instance, according to the WTO's first Director General, Renato Ruggiero:

'…the Dispute Settlement system [is] in many ways the central pillar of the multilateral trading system and the WTO's most individual contribution to the stability of the global economy... By reducing the scope for unilateral actions, it is also an important guarantee of fair trade for less powerful countries' [WTO website, May 1999].

However, data from the first four years seems to speak a different language. Developed countries have by far been the most active users of the DS system, with the G4 countries – Canada, EC, Japan and US – accounting for over 60% of all complaints. Three-quarters of the membership has not used the system at all since its inception, and in this group one finds most developing and all the least developed countries. The limited use of the DS system by non-industrialized countries has prompted a debate about whether the DS system is biased against smaller and poorer countries. A recent reflection of such sentiments is the statement by the WTO Ambassador of Ecuador, who according to The *Financial Times* (20/1 November 1999) '...contrasted the way the EU was flouting its WTO obligations [the failure to implement the ruling in the Banana dispute] with the pressure being put on poorer nations to implement burdensome WTO agreements such as the one on protecting intellectual property.' This discussion is part of the broader tensions between North and South within the WTO, tensions that have come to the forefront in the preparations for a new round of multilateral trade negotiations.

From a formal point of view, the right to bring complaints is firmly laid down in the Dispute Settlement Understanding (DSU). Moreover, while the rulings of the first legal instance – the panel inquiry – can be appealed, the review of the Appellate Body is the final word and cannot be blocked by the Respondent. It thus appears as if the issue is not so much whether there is unequal right to adjudication, as whether there are other impediments that hold back developing countries from using the system to root out illegal trade barriers that they may face. Several arguments to this effect have indeed been suggested. For instance, it is commonly held that less developed countries lack the necessary legal resources to bring complaints to the WTO. Another claim is that power-based factors enter the litigation decision. For instance, small countries may be discouraged from bringing complaints if their prospects of enforcing rulings in their favour are bleak because of limited retaliatory power. Or, small developing countries may exercise self-constraint

in picking their fights in order not to jeopardize privileges they depend on, for example, development aid and unilateral trade preferences.

The purpose of this paper is to initiate an examination of whether countries challenge trade measures to the extent one would expect on the basis of their trading interests and, if not, what the reasons might be for the observed discrepancies.

The paper employs a simple probabilistic model of litigation in which the notion of biased participation is given a precise definition. The basic idea is that the probability of encountering disputable trade measures is proportional to the diversity of a country's exports over products and partners, which means that larger and more diversified exporters would be expected to bring more complaints than smaller and less diversified exporters. It is shown that the theoretical distribution of disputes generated by this simple incidence model goes quite far toward predicting the actual pattern of complaints across countries. The predictive power is further enhanced when the cost of litigation is accounted for, a factor that brings down the expected number of complaints by smaller and poorer countries whose trade generally involve smaller values than the trade of larger and richer countries.

The benchmark model still leaves some features of the use of the DS system unexplained, including the seemingly disproportionate number of complaints brought by some of the largest trading nations in the world, notably Canada, the European Union and the United States. This raises the question of whether legal capacity and power-based considerations influence the propensity to bring disputes to the WTO. This paper shows that legal capacity seems to matter in the expected way, although it should be emphasized that our proxy is not entirely satisfactory. The evidence is much less compelling with regard to the notion that strong countries exploit their economic power to target weaker countries, and weaker countries abstain from using the system due to fear of retaliation, etc. It is found that the G4 countries, with the notable exception of Japan, indeed bring more disputes than suggested by the model. However, this ‘over-representation’ is only manifested between the G4 countries themselves, thus casting doubts on power-based factors as important determinants of the use of the DS system. In particular, no evidence is found to suggest that large countries target small countries disproportionately, or that small countries bring fewer complaints against large countries than expected.

1. Introduction

The Dispute Settlement (DS) system of the World Trade Organization (WTO) has been in place since 1 January 1995. High hopes have been attached to the system, in particular with regard to the protection it has been expected to afford to the interests of the smaller Member countries of the organization. For instance, according to the WTO's first Director General, Renato Ruggiero:

> "….the Dispute Settlement system [is] in many ways the central pillar of the multilateral trading system and the WTO's most individual contribution to the stability of the global economy... By reducing the scope for unilateral actions, it is also an important guarantee of fair trade for less powerful countries" [WTO Web site, May 1999].

However, data from the first four years seems to speak a different language. Developed countries have by far been the most active users of the DS system, with the G4 countries – Canada, EC, Japan, and US – accounting for over 60% of all complaints.[1] Three-quarters of the membership has not used the system at all since its inception, and in this group one finds most developing and all the least developed countries. The limited use of the DS system by non-industrialized countries has prompted a debate about whether the DS system is biased against smaller and poorer countries.[2] This discussion is part of the broader tensions between North and South within the WTO, tensions that have come to the forefront in the preparations for a new round of multilateral trade negotiations.

From a formal point of view, the right to bring complaints is firmly laid down in the Dispute Settlement Understanding (DSU). Moreover, while the rulings of the first legal instance – the panel inquiry – can be appealed, the review of the Appellate Body is the final word and cannot be blocked by the Respondent. It thus appears as if the issue is not so much whether there is unequal right to adjudication, as whether there are other impediments that hold back developing countries from using the system to root out illegal trade barriers that they may face. Several arguments to this effect have indeed been suggested. For instance, it is commonly held that less developed countries lack the necessary legal resources to bring complaints to the WTO. Another claim is that power-based factors enter the litigation decision. For instance, small countries may be discouraged from bringing complaints if their prospects of enforcing rulings in their favor are bleak because of limited retaliatory power. Or, small developing countries may exercise self-constraint in picking their fights in order not to jeopardize privileges they depend on, for example, development aid and unilateral trade preferences.

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[1] See Hudec (1999) for descriptive statistics of WTO disputes during the first 3 years of its operation.

[2] A recent reflection of such sentiments is the statement by the WTO Ambassador of Ecuador, who according to Financial Times (November 20/21, 1999) "...contrasted the way the EU was flouting its WTO obligations [the failure to implement the ruling in the Banana dispute] with the pressure being put on poorer nations to implement burdensome WTO agreements such as the one on protecting intellectual property."

The purpose of this paper is to initiate an examination of whether countries challenge trade measures to the extent one would expect on basis of their trading interests, and if not, what the reasons might be for the observed discrepancies.[3]

The analysis starts with a brief review of the main features of the DS process. Section 3 then introduces a simple probabilistic model of litigation, in which the notion of biased participation is given a precise definition. The basic idea is that the probability of encountering disputable trade measures is proportional to the diversity of a country's exports over products and partners, which means that larger and more diversified exporters would be expected to bring more complaints than smaller and less diversified exporters. It is shown that the theoretical distribution of disputes generated by this simple incidence model goes quite far toward predicting the actual pattern of complaints across countries. The predictive power is further enhanced when the cost of litigation is accounted for, a factor that brings down the expected number of complaints by smaller and poorer countries whose trade generally involve smaller values than the trade of larger and richer countries.

The benchmark model still leaves some features of the use of the DS system unexplained, including the seemingly disproportionate number of complaints brought by some of the largest trading nations in the world, notably Canada, the European Union and the United States. This raises the question of whether legal capacity and power-based considerations influence the propensity to bring disputes to the WTO. Section 4 shows that that legal capacity seems to matter in the expected way, although it should be emphasized that our proxy is not entirely satisfactory. Section 5 then examines whether the pattern of disputes among countries is consistent with the notion that strong countries exploit their economic power to target weaker countries, and that weaker countries abstain from using the system due to fear of retaliation, etc. It is found that the G4 countries, with the notable exception of Japan, indeed bring more disputes than suggested by the model. However, this "over-representation" is only manifested between the G4 countries themselves, thus casting doubts on power-based factors as important determinants of the use of the DS system. In particular, we find no evidence that large countries target small countries disproportionally, or that small countries bring fewer complaints against large countries than expected.

Section 6 discusses some of the strong assumptions underlying the above results, and directions for future research. Section 7 concludes.

[3] The closely related aspect of whether the adjudication process itself provides equal opportunity to small and

2. The DS process[4]

When a country encounters a trade measure that seemingly violates the WTO Agreement, the first action would normally be to raise the matter directly with the trading partner in question. In many cases, informal bilateral consultations may resolve the problem. However, if the issue can not be settled informally, the Complainant has the right to bring the matter to the WTO for adjudication.

The formal process takes its beginning when a country requests consultation at the WTO. The request includes a brief description of the measure(s) concerned and the legal grounds for the complaint.[5] The Respondent is obliged to reply to the request within ten days, and to grant opportunity to consult, in order to resolve the dispute amicably, within thirty days. Should the Respondent refuse to consult on the matter, the Complainant can request the establishment of a panel after thirty days. Otherwise, the consultation period is set to sixty days to allow the parties sufficient time to sort out their differences bilaterally. Should a settlement be reached, it must be notified to the Dispute Settlement Body (DSB) and the relevant Councils and Committees (Art 3.5 DSU) in order to ensure that it does not violate any provisions of the WTO Agreement to the disadvantage of other Members. If within sixty days no solution can be reached, and unless parties to the dispute agree to an extension of the consultation period, the Complainant can proceed to the adjudication stage (Art. 4.3 DSU).

The adjudication stage starts with a formal request for a panel inquiry into the matter. Panels will be automatically established the second time such a request appears on the agenda of the DSB (Art. 6 DSU). The composition of the panels will be agreed by the parties or, in case parties cannot agree within 20 days, will be decided by the WTO Director-General (Art. 8.7 DSU). The panel proceedings consist of written submissions and oral hearings where the parties are provided two or more opportunities to present their case before the panelists, and to rebut the legal and factual arguments of the other side. The panelists, with the assistance of the staff of the Legal Division of the WTO, will then issue a report, including the ruling. This report should be circulated within six months after the initiation of the panel (Art. 12.8 DSU), or exceptionally within nine months (Art. 12.9 DSU), unless the parties to the dispute request a suspension of the proceedings (Art. 12.12 DSU). Once issued, panel reports must be adopted within sixty days (Arts. 16.1 and 16.4 DSU), unless one or both sides decide to appeal against the rulings to the Appellate Body (AB).

The mandate of the AB is limited to reviewing the legal arguments of the panel report. The Appellate Body must issue its report within sixty, and in exceptional circumstances, within ninety days (Art. 17.5 DSU). The report must be presented before the DSB for adoption within thirty days

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large countries will be addressed in future research.

[4] A fuller description of the legal process can be found in Cameron and Campbell (1998), and Palmeter and Mavroidis (1999).

[5] Third parties can join in the consultations provided that the defendant so agrees (Art. 4.11 DSU).

from its circulation (Art. 17.14 DSU), and will be adopted unless it is unanimously rejected (the winning party being part of the unanimous vote).

Respondents found guilty of violating the rules will be accorded a "reasonable period of time" to bring inconsistent measures into compliance with their WTO obligations, not exceeding fifteen months (Art. 21.3c DSU). At the end of this period there are two possibilities. If the Respondent takes no action towards compliance, the Complainant can request authorization to take countermeasures (Art. 22.2 DSU), which will be granted within ten days (Art. 22.6 DSU). These measures have to be "equivalent to the level of nullification or impairment" (Art. 22.4 DSU), and thus do not allow for any form of punitive damages. On the other hand, if the Respondent did take some action towards compliance, but the actions are deemed unsatisfactory by the Complainant, recourse must be made within ninety days to the original panel, if possible, to rule on the adequacy of implementation (Art. 21.5 DSU).

As evidenced by the description above, all WTO Members have a right to seek adjudication for their trade grievances. However, there may be other impediments that hold back certain Members from exercising this right. First, the legal proceedings are often lengthy, and may involve considerable costs.[6] Second, small countries may be discouraged from bringing complaints if their prospects of enforcing rulings in their favor are bleak because of limited retaliatory power, especially since there is no mechanism for collective punishment of recalcitrant Respondents. Or, small developing countries may exercise self-constraint in picking their fights in order not to jeopardize privileges they depend on, including development aid and unilateral trade preferences.

3. Is the use of the DS system biased?

If we knew the extent to which countries are affected by disputable trade measures in their export markets (DTMs) – that is, trade or trade-related measures that potentially violate a provision of the WTO Agreement – we could immediately determine whether there are any biases in the propensity to bring disputes to the DS system by simply comparing the distribution of complaints with that of DTMs. The problem is of course that the distribution of DTMs is unobservable since only a subset of all potential disputes arrive at the WTO.

Some would argue that the correlation between legal trade barriers, such as tariffs bound in WTO schedules, and DTMs is likely to be positive. Sectors with powerful lobbies, such as textiles, clothing and agriculture, are presumably more successful than other sectors also in the lobbying for trade measures of a doubtful legal nature. In the same vein, protectionist governments are presumably more ready to accommodate such demands than free-trade inclined governments. If this were true, we

could use legal trade barriers as a proxy for unobservable DTMs facing various WTO members in their export markets. However, it could equally well be the other way round. Sectors and countries that are already protected by regular trade barriers have presumably less need for additional trade measures of a doubtful nature. That is, the correlation between legal and illegal trade measures could possibly be negative. Others might argue that we should expect more DTMs in large countries, referring to the "monopoly tariff" argument. But, on the other hand, such considerations are presumably already reflected in the level of tariff bindings and other legal trade barriers.

Lacking a theory for the distribution of DTM, we assume that they are randomly and uniformly distributed over markets, products, and, to the extent they are non-MFN, also trading partners. Given this assumption, it does not matter what you export and to whom you export, the probability of encountering a DTM for any given product in any given market is the same.[7] Of course, this does not mean that all countries will encounter the same number of DTMs in total, since they differ in terms of their export diversity. Rather, the more diversified the exports are over products and markets, the more DTMs you would expect to encounter. Nor does it follow from this assumption that countries are equally protectionist, only that they are equally prone to violate whatever commitments they have made in the WTO.

3.1 The model

Formally, let γ denote the probability that any given product in any given market faces a DTM. Let q_{ij} be the probability that country i detects and complains against such a measure maintained by country j. The probability of observing $z = \{0, 1, 2, \ldots\}$ complaints by country i against country j is then binomially distributed,

$$f_{ij}(z) = \binom{n_{ij}}{z} p_{ij}^{z} (1-p_{ij})^{n_{ij}-z}, \tag{1}$$

where n_{ij} is the number of products exported by i to j, as defined more precisely below, and where $p_{ij} = gq_{ij}$ is the probability that i litigates against j for any given product exported to j.

The expected number of complaints by i against j,

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[6] Adding the time limits described above, one finds that the legal proceedings can last up to almost three years before the Complainant can take countermeasures. While a considerable length of time, time limits in the WTO fair quite well when compared with dispute procedures in national courts for matters of comparable complexity.

[7] An alternative hypothesis would be to assume that the number of DTMs is proportional to the value of exports. However, this seems less plausible, considering the fact that trade barriers are normally product-specific, and typically independent of the export values concerned.

$$E(y_{ij}) = \sum_{z=0}^{n_{ij}} z f_{ij}(z) = n_{ij}\pi_{ij}, \quad (2)$$

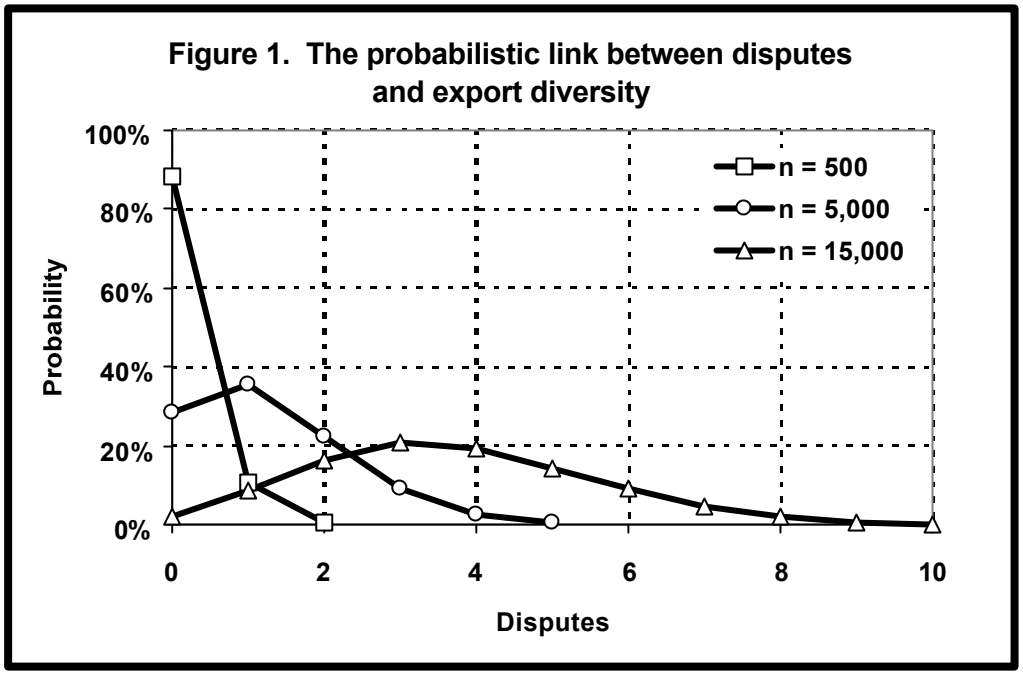
is strictly proportional to the number of products exported to j. Summing over all trading partners we get the expected total number of complaints by i against all other WTO Members:

$$E(y_i) = \sum_{j \neq i} n_{ij}\pi_{ij} = \gamma \sum_{j \neq i} n_{ij}\theta_{ij}. \quad (3)$$

Some features of this simple model are illustrated in Figure 1, which plots the probability of observing various numbers of complaints for three countries that differ only in their export diversity (i.e., $\theta_{ij} = \theta$, and consequently $\pi_{ij} = \pi$ for all (i,j)). The exports of country 1 cover a total of 500 product-market pairings (PMPs) – bikes to country 2, steel to country 3, etc. The corresponding values for countries 2 and 3 are 5000 and 15000, respectively. The example is based on the assumption that π equals 0.00025. The example illustrates that larger countries, which tend to be more diversified, can be expected to file more complaints at the WTO. We can also expect a higher variance (in absolute terms) among larger and more diversified exporters than among smaller and less diversified exporters. It should also be noted that the binomial distribution is skewed to the right, suggesting that a few countries may have considerably more disputes than other countries of similar size.

Let us now introduce the final component of the model. It seems reasonable to assume that litigation involves some fixed costs, and that therefore the trade values involved must exceed some minimum level for litigation to be worthwhile. Formally, the parameter n_{ij} is then the number of products exported by i to j for which exports exceed a given threshold. Likewise, θ_{ij} is the probability of detecting and acting against DTMs in the subset of cases where trade exceeds this threshold. As these thresholds are not known, we experiment with the two levels, \$1 million and \$10 million, alongside the benchmark case without threshold.[8]

[8] This case actually implies a threshold of \$1000 dollar, which is the lowest value recorded in the UN trade statistics.



3.2 Trade data

To implement the model above we need data on the number of products for which the exports of country *i* to country *j* exceed the given threshold levels. To this end we use the COMTRADE data of the United Nations. This data provide, at least in theory, a full trade matrix on a fairly detailed product level, although the reliability of the reporting may vary quite considerably among countries. Because of data problem, we have to make a few compromises.

First, only a limited number of WTO Members report disaggregated trade classified according to the Harmonized System (HS). To extend the number of reporters, we use trade data classified according to the older Standard International Trade Classification (SITC) system, revision 3, which covers 77 WTO Members (counting EU as one). The data is from 1995. To fill the holes of the remaining countries, the exports of non-reporting countries are derived from the import side of reporting countries. This procedure underestimates the export diversity of non-reporting countries, since we have no data for the trade between these countries.[9] Secondly, while the SITC data is in principle harmonized down to the 6-digit level, we choose to work with data at the 4-digit level, which we believe is more consistent across countries. The drawback is that two countries with positive trade at the 4-digit "sector" level may differ in terms of diversification at a finer level of disaggregation. We may then falsely conclude that all countries with positive trade at the "sector" level (there is about 1000 tariff lines at the 4-digit level) face a given trade barrier, although it only

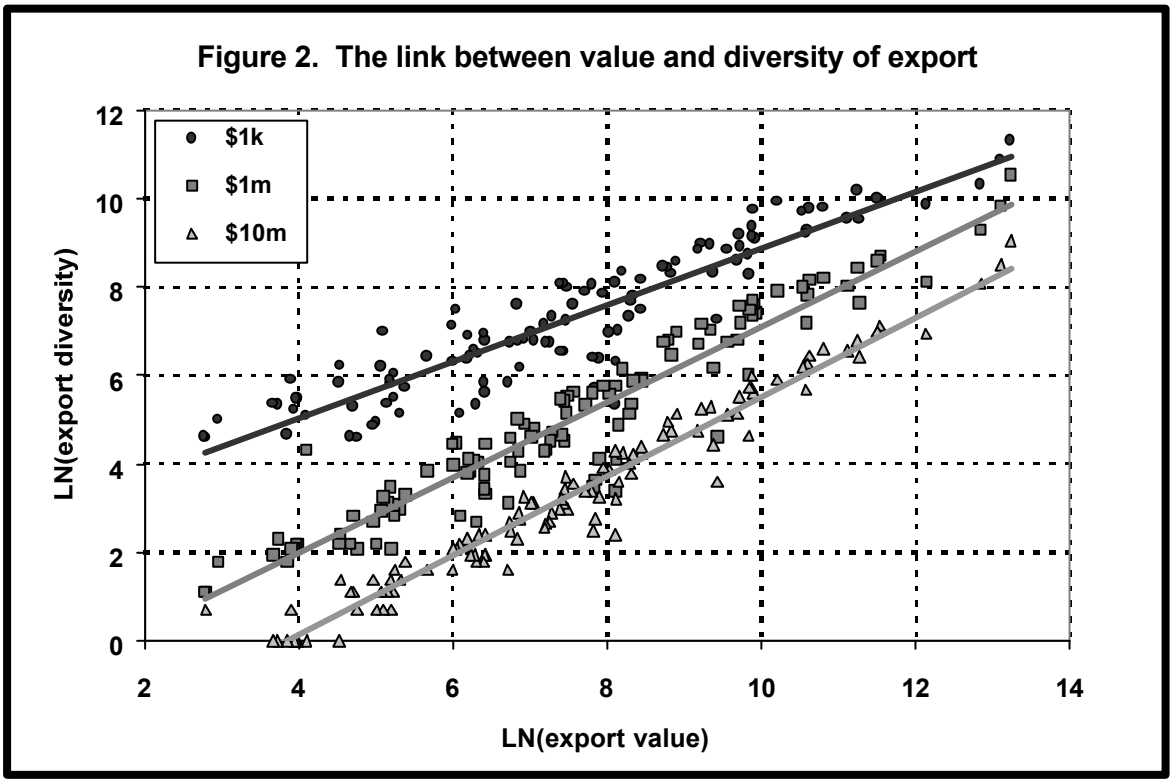
[9] The underestimation is probably limited. Non-reporting countries are typically small developing countries, often LDCs, that presumably do not trade very much with each other. For example, most trade of African LDCs is with developed countries, all of which are reporters.

applies to those countries that export a certain product within that sector, say, steel of a certain kind. Thirdly, the COMTRADE data cover only merchandise trade. There exist no corresponding matrix for trade in services.

The number of PMPs per country is given in Table A1 in the Appendix, for the 113 WTO Members (counting EC as one) included in this study. Five small Member countries had to be omitted due to lack of data (Botswana, Lesotho, Liechtenstein, Namibia, and Swaziland).

A log-linear plot of this data (Figure 2) against the total value of exports illustrates the close correlation between value and diversity of exports. An OLS regression suggest that a one percent increase in merchandise exports is on average associated with 0.64 percent increase in the export diversity over products and markets in the case without threshold. This relationship is rather exact, with an R^2 of 0.85. Thus, large WTO Members would typically encounter more DTMs than smaller Members, and hence should be expected to bring more complaints, but less than proportionally to their share of world trade.

Figure 2. The link between value and diversity of export



3.3 Dispute data

Our dispute data stems from the first four years of the DSU (1995-1998). During this period 155 requests for consultations were filed. For the purpose of our study, some adjustments in the raw data are necessary in order to fit the data into the above framework.

First, a WTO dispute could involve several countries. We treat these cases as separate Complainants even if the requests for consultation were filed jointly. Second, certain conflicts appear several times in the shape of different WTO disputes. This is often explained by the fact that consultations exceeding 12 months need to be renewed, and then appear as separate WTO disputes. We lump these cases together to avoid double counting.

The well-known *Bananas* dispute may serve as an illustration of how we account for the first and second aspect. In September 1995, four countries requested consultation with the EC regarding its banana regime, which was assigned the WTO Disputes Series number 16. This complaint was superseded in February 1996 by a renewed request for consultation, with number 27, filed by the four initial Complainants and a fifth country. Since the subject matters in both cases were exactly the same, we treat both these requests as referring to the same underlying dispute. On the other hand, since we are interested in bilateral relationships, we count *Bananas* as five separate disputes: EC vs. Ecuador, Guatemala, Honduras, Mexico, and the US, respectively.[10]

A third form of modification concerns WTO disputes involving individual EC countries as Respondents. Our method here is to view each such dispute as directed against the EC instead of the individual member country. However, when several EC countries respond to the same allegations, we group them as one dispute to avoid double counting. For example, the WTO Disputes Series 83 (Denmark - Measures Affecting Enforcement of Intellectual Property Rights) and Dispute Series 86 (Sweden - Measures Affecting Enforcement of Intellectual Property Rights) refer to the same subject-matter, and are therefore viewed as one bilateral dispute, with the EC as Respondent.

The fourth modification is to exclude disputes that do not primarily affect export interests of the Complainant, e.g., export quotas maintained by Respondent, and which hence do not fit into the framework above. This classification, which by necessity is somewhat arbitrary, results in the exclusion of two WTO disputes.

[10] Since the complaints covered several provisions of the banana regime, including violation of the MFN tariff, discriminatory allocation of export licenses among exporting countries, discriminatory allocation of import licenses among distributors of bananas, one could further subdivide the dispute into various "subject-matters". The Banana case would then be treated as 5x3 =15 separate disputes, or perhaps somewhat fewer since not all Complainants raised the same legal issues. However, this approach requires a clear definition of "subject-matter", as well as an extensive analysis of each case, and is therefore left for future research.

Applying these adjustments to the consultation requests filed with the WTO 1995-98, we obtain 146 "bilateral disputes" (BD).[11] The distribution of these disputes over countries is detailed in Table 1.

Table 1. Distribution of BDs over countries

Complainant	No. of BDs	% of BDs	Respondent	No. of BDs	% of BDs
EC	37	25.3	EC	32	21.9
United States	35	24.0	United States	29	19.9
Canada	13	8.9	India	12	8.2
India	8	5.5	Japan	12	8.2
Brazil	5	3.4	Canada	8	5.5
Japan	5	3.4	Brazil	7	4.8
Mexico	4	2.7	Korea	7	4.8
New Zealand	4	2.7	Argentina	6	4.1
Thailand	4	2.7	Hungary	6	4.1
Switzerland	3	2.1	Australia	5	3.4
Argentina	2	1.4	Turkey	4	2.7
Australia	2	1.4	Indonesia	3	2.1
Chile	2	1.4	Chile	2	1.4
Hungary	2	1.4	Mexico	2	1.4
Korea	2	1.4	Slovak Republic	2	1.4
Philippines	2	1.4	Czech Republic	1	0.7
Colombia	1	0.7	Guatemala	1	0.7
Costa Rica	1	0.7	Malaysia	1	0.7
Ecuador	1	0.7	Pakistan	1	0.7
Guatemala	1	0.7	Peru	1	0.7
Honduras	1	0.7	Philippines	1	0.7
Hong Kong, China	1	0.7	Poland	1	0.7
Indonesia	1	0.7	Thailand	1	0.7
Malaysia	1	0.7	Venezuela	1	0.7
Pakistan	1	0.7	**Sum**	**146**	**100**
Panama	1	0.7			
Peru	1	0.7			
Poland	1	0.7			
Singapore	1	0.7			
Sri Lanka	1	0.7			
Uruguay	1	0.7			
Venezuela	1	0.7			
Sum	**146**	**100**			

[11] It should also be noted that the 146 BDs are at different stages in the legal process. However, since our data is recorded as a country requests consultation, it does not seem as a problem for our analysis. Further details on the data are provided in the Appendix.

3.4 Benchmark model meets data

We are now set to examine whether there are any biases in the propensity to bring disputes to the DS system, for example, between larger and smaller countries, or poorer and richer countries. As an "unbiased" benchmark we will take the case where the only reason why countries differ in the number of complaints is that they differ in terms of export diversity. The maintained hypothesis is that countries are equally prone to discover and complain against whatever DTMs they are exposed to. Formally, this corresponds to the situation where $q_{ij} = q$ for all (i,j), or equivalently, $p_{ij} = p$. The purpose is to compare the total number of actual complaints per country with the number that would be "unbiased" as suggested by the model, based on the maximum-likelihood estimate of p.

Formally, provided that the complaints are independent of each other, the log of the joint probability of observing the data on actual complaints $(y_1,\ldots,y_i,\ldots,y_{113})$ is given by the likelihood function

$$L = \sum_i \left[\ln\left(\frac{n_i!}{(n_i - y_i)!\, y_i!} \right) + y_i \ln(p) + (n_i - y_i)\ln(1-p) \right], \tag{4}$$

where the summation is over the 113 Member countries included in the study. The maximum-likelihood estimates of p and the associated standard deviation are

$$\hat{p} = \frac{\sum_i y_i}{\sum_i n_i}, \qquad \hat{s} = \sqrt{\frac{\sum_i y_i \left(\sum_i n_i - \sum_i y_i \right)}{\left(\sum_i n \right)^3}}. \tag{5}$$

The results are presented in Table 2 for the three different threshold levels. If we concentrate on the case without threshold for now, we find that the maximum likelihood estimate of p is 0.00025, with a standard deviation of 0.000021. Since the standard deviation is less than a tenth of the point estimate, we can directly reject the hypothesis that p is zero at virtually any degree of confidence. The overall fit of the regression, as approximated by the (pseudo) R^2, is 0.66.

Table 2. The estimated model at different thresholds

	Thresholds		
	$1k	**$1m**	**$10m**
δ	2.5E-03 (2.1E-05) **	1.1E-03 (8.7E-05) **	4.8E-03 (4.0E-05) **
R^2	0.66	0.83	0.86
Log likelihood	-112.8	-98.8	-97.5

** Significant at the 1% level

Figure 3 plots the actual number of complaints (marked by dots) against the expected number of complaints (marked by the continues line) for the case of no threshold, bounded by a 95 percent confidence interval (marked by the dashed lines). Since most observations are concentrated in the region $\ln(n_i) < 7$ (approximately corresponding to $n_i < 1000$), export diversity is expressed in terms of the logarithm of n_i to enhance the readability of the graph. As can be seen, most WTO Members are within the bounds of the 95 percent confidence interval. However, three of the main exporters – Canada, the European Union, and the United States – bring considerable more complaints than predicted by this simple incidence-based model. In contrast, the other G4 country – Japan – file less complaints than expected, although still within the confidence interval. The model hence performs rather poorly with regard to the major exporters of the world.

Figure 3. Expected vs. acctual number of bilateral disputes absent threshold

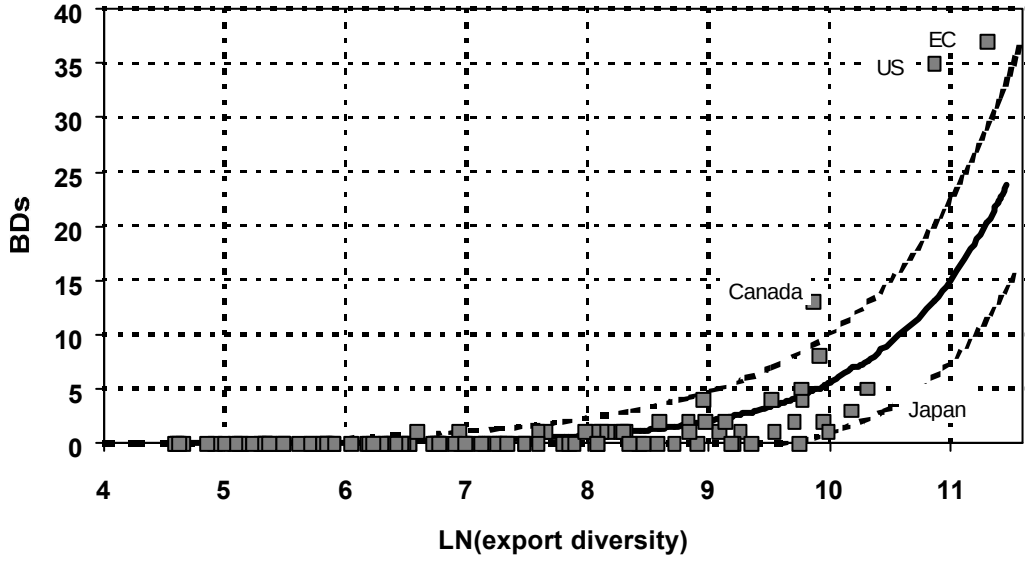
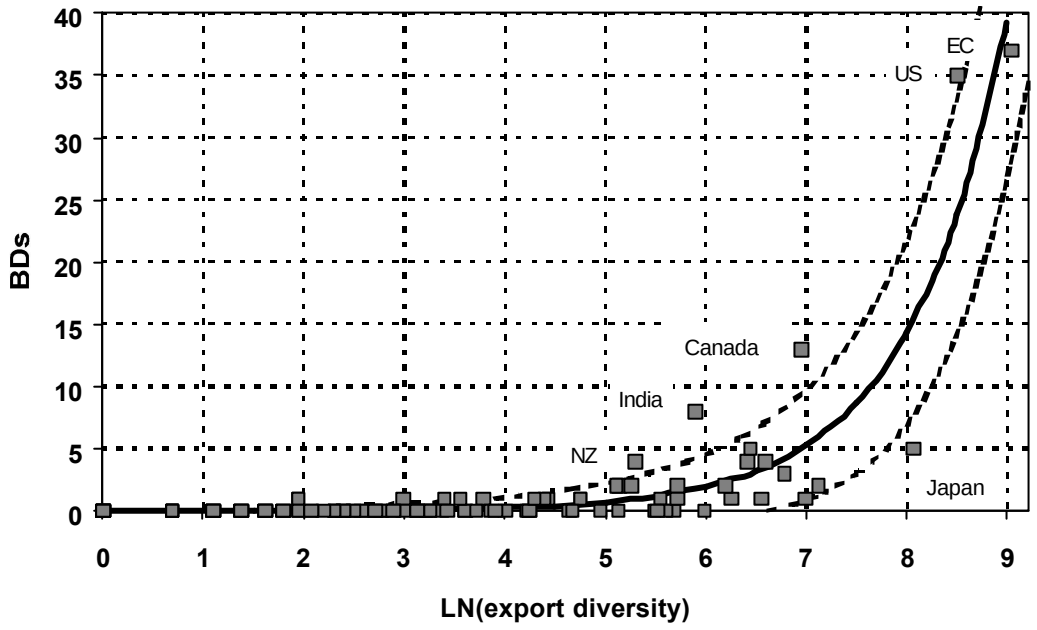


Figure 4 provides the same information for the case of a $10m threshold. The introduction of a threshold reduces the number of product-market pairings for which a complaint would be beneficial, and proportionally more so for smaller countries, which tend to export less in each product category (see Figure 2). The introduction of a threshold improves the overall fit of the model considerably, as indicated both by a higher (less negative) likelihood value, and also by a higher (pseudo) R^2. At the same time, some countries still fall outside the confidence interval, as seen in Figure 4. The litigation activities of the United States and Canada are still badly explained by the model, while those of the European Union is now well within the confidence interval. Moreover, some new countries emerge as over-represented, namely, India and New Zealand, whereas Japan is under-represented.

Figure 4. Expected vs.actual number of bilateral disputes with a $10m threshold



In sum, the simple model laid out above is able to explain some of the differences across countries in the use of the DS system on the basis of differences in export diversity. The explanatory power is further enhanced once fixed litigation costs are taken into account. However, even with the latter modification, the Figure suggests a systematic pattern whereby larger and richer countries tend to bring more complaints, and smaller and poorer countries less complaints, than expected. One reason could be that developing countries as opposed to developed countries lack legal resources to bring complaints to the WTO. In the next section we shall try to shed some light on the importance of this factor.

4. Does human capital affect the use of the DS system?

Trade laws have become more complex over time, both because of the expanded coverage, encompassing new areas such as trade in services and trade-related intellectual property rights, and because of increased intertwining with other areas of international law, such as environmental and labor law. Today, it can be very difficult, even for legal experts, to evaluate whether a trade or trade-related measure is actually a breach of the WTO Agreement, and if so, whether other international laws take precedence. One explanation for the seeming over-representation of industrialized countries on the Complainant side, with the notable exception of Japan, is perhaps that the more advanced countries are better equipped to identify questionable trade barriers, and furthermore to prepare and argue the case before WTO dispute panels.

Both the identification stage and the action stage are intensive in legal human capital. As far as the identification stage is concerned, some countries are clearly better equipped than others to identify breeches of the WTO Agreement. The large trade administrations in the world devote considerable resources to screen the trade polices of other countries, and maintain well-oiled routines for handling complaints by the domestic export industry.[12] And even if smaller developing countries were able to identify illegal trade barriers on their own, or with assistance of public reports,[13] they may still lack the resource to take legal action. Some assistance can be requested from the Secretariat of the WTO, but only general legal advice since a direct involvement would jeopardize the impartiality of the staff. Of course, the lack of domestic legal expertise on international trade law could in principle be compensated for by contracting foreign expertise. But the cost of doing so may be prohibitive for poor developing countries.

In terms of our model, this reasoning suggests that countries may differ both in terms of their ability to identify and to take actions against potentially illegal trade barriers. Countries with more human and legal resources are likely to score better on both accounts. If we had data on the legal capacity of national trade administrations, we could directly investigate the link between this variable and the number of complaints brought by each country. However, to the best of our knowledge, no such statistics are available.

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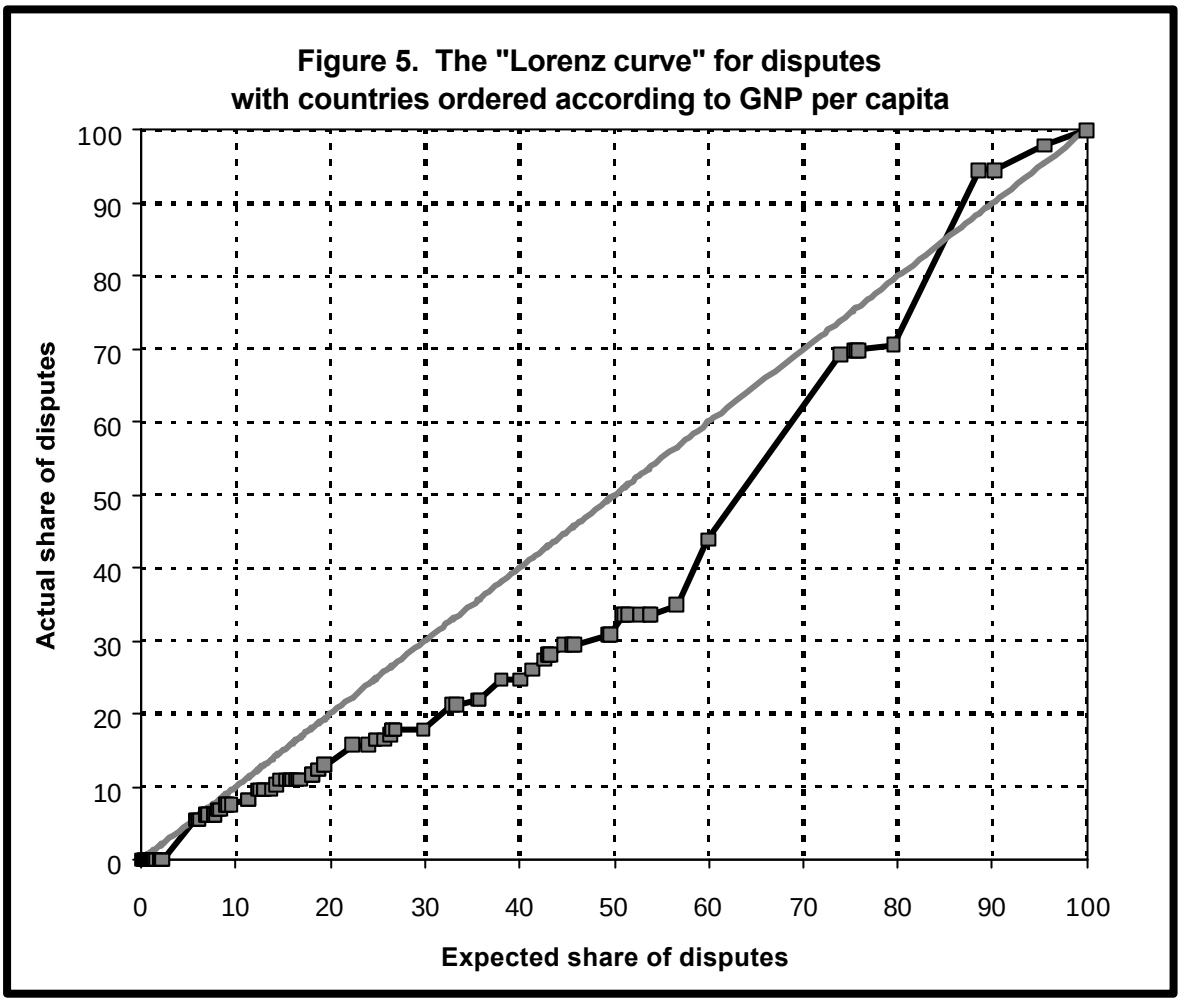
[12] For example, the U.S. Department of Commerce operates a "Trade Compliance Center" to which exporters can file their grievances, including through e-mail. Other trade authorities in developed countries, including the European Commission, have similar mechanisms for eliciting complaints concerning trade barriers maintained by trade partners.

[13] For example, fairly detailed accounts of the trade practices of WTO Members are provided in the Trade Policy Review reports of the WTO. However, while WTO Members are required to cooperate with the Secretariat in preparing these reports, it goes without saying that countries do not always volunteer information on trade measures that are potentially inconsistent with their WTO obligations. What is more, the reviews are only undertaken at some intervals, up to six years for developing countries, and longer still for the least developed countries. Between these reviews, trade measures may both come and go, something that only active traders and trade administrations will realistically notice. First-hand information by exporting firms is perhaps the only reliable way of learning about *current* trade policies in the detail necessary to understand whether a legal action would be fruitful.

One option is to use GNP per capita as a proxy for human capital in general, and the ability of countries to detect and challenge breeches of the WTO Agreement in particular. Figure 5 shows the tendency for richer countries to bring proportionally more complaints than poorer countries, which suggest the existence of a "Lorenz curve" for disputes. The Figure is constructed by first sorting the countries in ascending order according to their GNP per capita at market prices. The expected share of disputes, as predicted by the benchmark model with no threshold, is then plotted against the actual share of disputes. The Figure shows that the poorer Members of the WTO tend bring fewer complaints than expected on the basis of the benchmark model, with some exceptions. In the first decile, comprising 31 countries, India makes up for the lack of legal activities of the other countries in the decile. India is perhaps a special case, in that it is poor on average at the same time as it has a comparatively well educated bureaucracy. This skill at the "right" places may allow India to challenge measures than other developing countries may have to drop because of lacking human capital. Also the tenth decile breaks the pattern, although it is difficult to draw any strong conclusion since it only includes two countries, Japan and Switzerland. Both countries are often characterized as "diplomacy-oriented", seeking to avoid overt confrontations in international relations.

While there seem to be some correlation between GNP/capita and the propensity to file complaints, this crude proxy for legal capacity does not yield any significant relationship at the 95% confidence level in formal regressions. One reason could be that legal human capital is poorly captured by GNP/capita. As suggested above, some developing countries may be poor in human capital on average (as reflected by a low GNP per capita), while at the same time have government administrations run by well educated people. We shall therefore try a more direct proxy, namely, the size of the representation at the WTO. The data is a simple headcount on the number of delegates listed in the WTO phone directory, taken from Michalopoulos (1999).[14] The idea is that countries with larger representations are better informed about developments in the trading system, including the DS system and the interpretation of rules. Presumably, there is some flow of both information and of personnel between Geneva delegations and national trade administrations. Also, the size of these delegations is probably correlated with the size of the national trade administrations. The maintained hypothesis is therefore that countries with large representations at the WTO have a higher propensity to detect and challenge breeches of the WTO Agreement.

[14] Some countries do not have any representation in Geneva but covers WTO matters from Brussels or other major cities in Europe. Arguably, these countries are not in the same position to follow the work of the WTO as



Assume for the purpose of this exercise that the propensity for country i to detect and bring disputes is invariable with respect to the trading partner concerned, that is, that $q_{ij} = q_i$. Let h_i denote the amount of legal resources put into these tasks by country i, as approximated by the size of the representation at the WTO, and let its impact on the propensity for i to detect and bring complaints be given by the increasing function $q_i = q(h_i)$. In order to ensure that $q(h_i)$ is bounded between zero and one, we adopt a logistic function specification. The probability for country i to bring a complaint in any PMP, $p(h_i)$, is then given by the product of γ and $q(h_i)$:

$$p(h_i) \equiv g\left(\frac{\exp(a+bh_i)}{1+\exp(a+bh_i)}\right), \tag{6}$$

those countries with local representation. Somewhat arbitrarily, we assign zero representation to countries without local representation.

Substituting (6) for p in the log-likelihood function above, we can estimate the three unknown parameters γ, a, and b.[15] In addition to the model without threshold, we also report the estimates for the recount of n_i's with \$1 million and \$10 million thresholds, respectively.

Table 3. The estimated model accounting for differences in legal capacity

	Thresholds		
	\$1k	**\$1m**	**\$10m**
g	3.9E-04 (4.4E-0.5)**	1.2E-03 (1.1E-0.4)**	5.0E-03 (4.5E-04)**
a	-3.0 (0.62)**	-2.0 (1.2)	-1.7 (1.7)
b	0.53 (0.12)**	0.71 (0.32)*	0.93 (0.59)
Log likelihood	-92.5	-95.8	-96.2

** Significant at the 1% level
* Significant at the 5% level

The results, reported in Table 3, suggest that countries with larger representations at the WTO, and presumably then also larger trade administrations at home, tend to have a higher propensity to file complaints ($b > 0$). However, the introduction of thresholds, while maintaining the sign patterns of the coefficients, renders the proxy for legal capacity less significant. One reason may be that the thresholds reduce the potential number of complaints that would be worthwhile proportionally more for smaller than for larger countries. Since larger countries tend to have larger representations at the WTO than smaller countries, our proxy for legal capacity may capture the same effect as the threshold. This "multicollinearity" problem makes it difficult to isolate the individual effects of costs of litigation (captured by the threshold) and legal capacity.

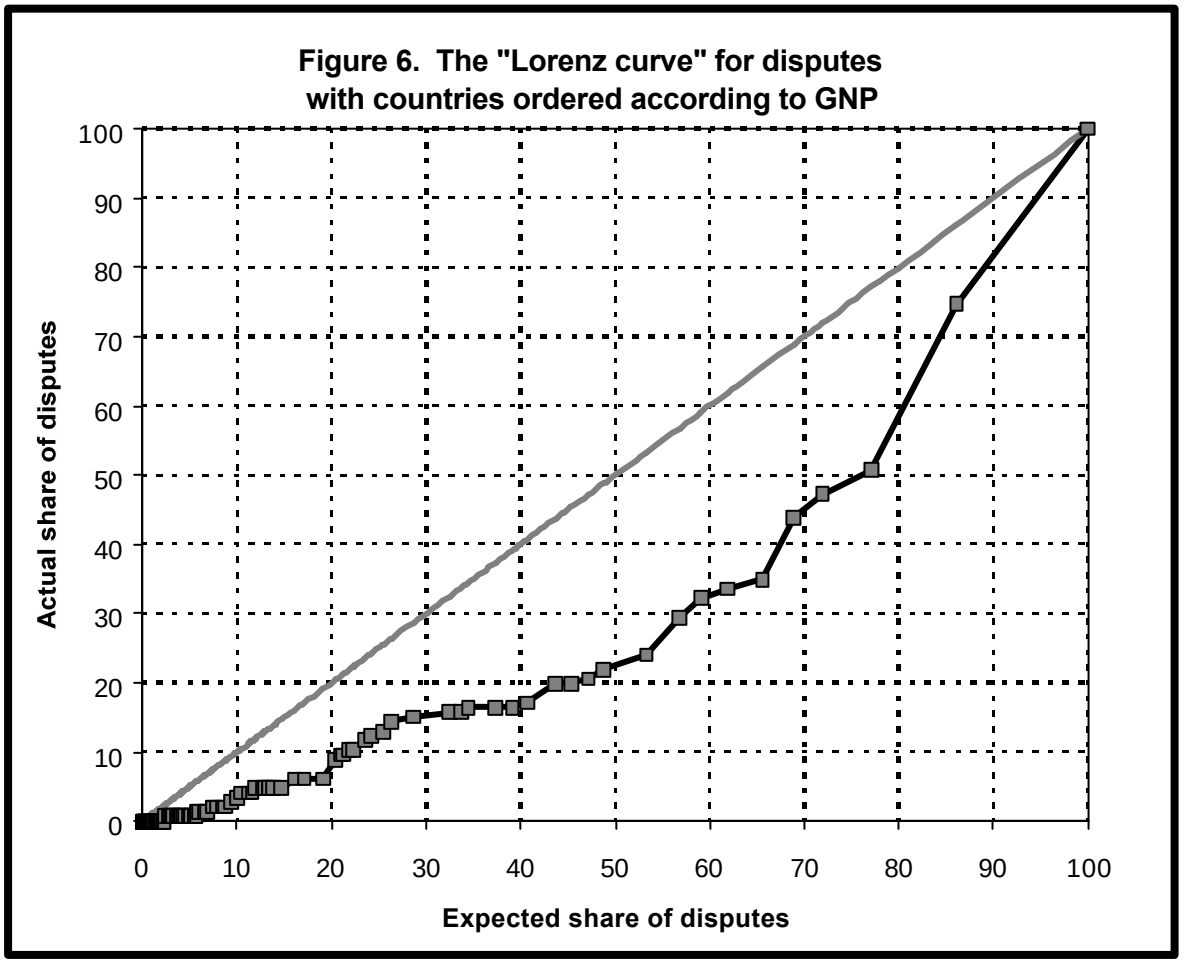
5. Does power affect the use of the DS system?

While the DS system provides formal "equality before the law", the incentives to use the system may differ between small and large countries. For example, small countries may have difficulties in enforcing rulings in their favor because of their limited retaliatory power, and may

[15] This estimation is done using TSP.4.4.

therefore find it pointless to bring their complaints to the WTO. Or smaller countries may refrain from bringing disputes against larger countries they depend on economically or politically. We will in this section employ the model and data to examine whether such factors influence the use of the DS System.

Consistent with the power based hypothesis, there is a tendency for economically more powerful countries, as measured by GNP, to bring proportionally more complaints than their export diversity would suggest. This is illustrated in Figure 6, which is constructed as Figure 5, but with countries ordered according to GNP instead of GNP/capita. The Figure clearly suggests that the larger the national income of the country, the more it is over-represented as Complainant, relative to the benchmark prediction. However, while Figure 6 is consistent with a power based interpretation, it is not a "proof", since a power-based argument would go one step further, suggesting also that large countries take on smaller and weaker countries, rather than equally powerful trading partners. In terms of the model above, the probability to pursue disputes would then increase in the difference in GNP between the exporter and the importer: $q_{ij} = q(GNP_i - GNP_j)$ where q is an increasing function.



The limited number of disputes (146) do not allow us to examine the question of who is targeting whom at a purely bilateral level. Instead, we aggregate the 113 countries into four broad groups – G4, other OECD countries, non-OECD countries other than LDCs, and LDCs[16] – and examine the pattern of disputes between these groups of countries. If power factors are important determinants of the pattern of complaints, then this should be reflected in an over-representation of G4 countries, in particular, and possibly also other OECD countries, against the other two groups.

Table 4a gives the distribution of complaints across the four groups. What is striking is the high proportion of disputes between G4 countries themselves – almost a third of all BDs fall into this category. Furthermore, while these countries stand for almost 62% of all complaints, they are also the targets in 55.5% of the disputes, out of which non-OECD countries stand for a significant part, or 18.5 percentage points.

Of course, one should expect many cases to be between the G4 countries due to their large bilateral trade flows. But, how many more? In order to address this question, we use the model to compute the difference between actual and expected number of BDs between the four groups of countries. The results for the no threshold case are reported in Table 4b and the case of the $10m threshold in Tables 4c. (The $1m threshold middle case is essentially a linear combination of the two other cases). As noted before, the G4 countries are over-represented in aggregate. However, this over-representation is mainly for intra-G4 complaints, and to a lesser extent against other OECD countries. It thus seems that G4 countries are *not* targeting developing countries disproportionally. Actually, for higher thresholds, G4 complains *less* than expected against non-OECD countries. In conclusion, the model and the data do not support the claim that power-based factors are important. What needs to be explained is rather the legal activity within the G4, such as the many cases brought by the EC and the United States against each other, and against Japan. This pattern is poorly captured by the model.

[16] We employ the UN classification of LDCs, implying that 27 of our 113 countries have this status.

Table 4a. Distribution of BDs (percentage points)

	Respondent				
Complainant	G4	Other OECD	Non-OECD non-LDC	LDC	**Sum**
G4	32.9	11.0	17.8	0.0	61.6
Other OECD	4.1	2.7	5.5	0.0	12.3
Non-OECD-non-LDC	18.5	4.1	3.4	0.0	26.0
LDC	0.0	0.0	0.0	0.0	0.0
Sum	55.5	17.8	26.7	0.0	100

Table 4b. Difference between actual and expected BDs without threshold (percentage points)

	Respondent				
Complainant	G4	Other OECD	Non-OECD non-LDC	LDC	**Sum**
G4	31.0	6.3	-2.9	-4.0	30.5
Other OECD	0.4	-1.3	-7.6	-1.0	-9.5
Non-OECD-non-LDC	10.1	-2.3	-22.8	-4.2	-19.2
LDC	-0.8	-0.2	-0.7	-0.2	-1.8
Sum	40.8	2.5	-34.0	-9.4	0.0

Table 4c. Difference between actual and expected BDs with $10m threshold (percentage points)

	Respondent				
Complainant	G4	Other OECD	Non-OECD non-LDC	LDC	**Sum**
G4	16.8	-5.8	-7.4	-0.4	3.2
Other OECD	-6.5	1.2	1.5	-0.1	-3.8
Non-OECD-non-LDC	5.3	1.9	-5.6	-0.3	1.2
LDC	-0.4	0.0	-0.2	0.0	-0.6
Sum	15.2	-2.8	-11.7	-0.8	0.0

6. Aspects requiring further consideration

Needless to say, the analysis above is based on a number of simplifying assumptions. We will in this section discuss some aspects requiring further consideration.

As noted in Section 2, whenever a DTM is encountered in an export market, the first action would normally be to raise the matter directly with the trading partner in question. In many cases, informal bilateral consultations may resolve the issue without need for formal adjudication. It is not clear how often such informal bilateral consultations take place, nor do we know the success rate of

such consultations, and the extent to which this rate systematically varies among countries.[17] In want of data on this point, we have so far implicitly adopted the assumption that a fixed proportion of the potential trade disputes are resolved through informal bilateral consultations and, furthermore, that this rate is equal for all countries that are being matched. That is, small developing countries are assumed to have the same success rate as large and powerful trading nations in resolving their trade grievances without recourse to the DS system. Thus, it is only the residual cases that we observe in our data, and the assumption is that this data is unbiased.

To illustrate the potential problems of this approach, consider the following scenarios in which a country *A* finds that a trading partner *B* maintains a potentially WTO-illegal trade measure:

(a) *A* does not pursue the case in any way.

(b) *A* raises the matter bilaterally with B without notifying the WTO. *B* does not change its policy in response to the consultation, and *A* does not to pursue the case further.

(c) *A* raises the matter bilaterally with country *B* without notifying the WTO. *B* changes its practice and *A* drops the claim. The solution is not notified to the WTO.

In a study of whether a dispute resolution system is equitable, it would clearly be desirable to include cases also of the above types. For instance, in the first case, the fact that the matter is not raised with the trading partner may be due to a fear of retaliation. For example, a complaint may trigger a counter-complaint, a possibility that was explicitly recognized in the DSU.[18] In the second and third scenarios the countries have consultations concerning the compatibility of a trade measure with the WTO Agreement, but do not notify the WTO.[19] It would be desirable to know why country *A* decides to drop the dispute in the second case, and why country *B* concedes in the third.

Another area for future research is to improve upon the assumption that all products and markets are equally prone to trade irregularities. While perhaps a justifiable first approximation, intuition might suggest that this is not the entire story, although it is far from clear to us what the true story is. But, since countries differ in their trade patterns, it is possible that systematic differences across sectors, or WTO Agreements under which the different sectors fall, may have prejudged the results in this study.

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[17] "Out of court" settlements are common in other areas of law. For example, in civil disputes in the US, some 90% of the disputes are solved amicably; see Ostrom and Kauder (1996) and Administrative Office (1995), cited in Kaplow and Shavell (1999).

[18] Article 3.10 of the DSU tries to establish a code of conduct to stem such tendencies: "It is understood that request for consultation and the use of the dispute settlement procedures should not be intended or considered as contentious acts and that, if a dispute arises, all Members will engage in these procedures in good faith in an effort to resolve the dispute. It is also understood that complaints and counter-complaints in regard to distinct matters should not be linked."

[19] Note that a strict reading of the DSU would suggest that a failure to notify the WTO is a violation of the DSU. According to DSU 4.4, "All ... requests for consultations shall be notified to the DSB….". The notification

For example, it is conceivable that new Agreements, such as the General Agreement on Trade in Services (GATS) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) give rise to proportionally more complaints than old Agreements, at least over the first few years of operations. Countries exporting products covered by the new Agreements should then figure predominantly as Complainants in the DS system. On the other hand, this reasoning presupposes that the importing countries, when deciding on their trade policies, do not take into account the uncertainty surrounding the interpretation of these Agreements. If they do take into account this uncertainty, they may rather act with prudence so as to avoid becoming targets for complaints.

Some ideas of the bearing of these arguments can be obtained from an initial examination of how countries differ in the Agreements they invoke, and the sectors in which they complain. Some preliminary statistics on these aspects are presented in Table 5 to 7. Table 5 depicts the distribution of the 146 BDs across sectors, where 14 disputes cover two sectors (resulting in 160 observations). Table 6 provides a similar description of the Agreements invoked, where each dispute involves on average two Agreements (resulting in 291 observations).[20] Table 7 provides a cross tabulation of Agreements against product groups. It is based on a subset comprising 133 of the 146 BDs. Excluded from the original set are those BDs in which more than one sector is involved, in order to ensure that the invoked Agreements actually refer to the product group with which they are matched.[21] In total there are then 247 such pairs of product groups and Agreements, and Table 7 gives the distribution of these over sectors and Agreements.

Several noteworthy features are highlighted in these Tables. First, as can be seen from Table 5, Agriculture and Foods is by far the dominant sectors in terms of complaints (34.4%), followed by the miscellaneous "General Goods" sectors (11.9%), Textiles (8.8%) and Vehicles (7.5%). What is particularly interesting about the disputes over Agriculture and Food is the apparent complexity of these disputes, as evidenced by the wide range of other Agreements (besides the Agreement on Agriculture) that are invoked in such cases. Indeed, as can be seen in Table 7 below, almost all Agreements have been invoked in disputes involving agricultural products.

Does the domination of Agriculture and Food bias the results presented before? Perhaps not. As shown in Table 5, the G4 countries have a lower share of their complaints in this product category compared to other countries. Hence, the over-representation of the G4 countries relative to the benchmark does not seem to be explained by their complaints in this sector.

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obligation is intended to ensure transparency in general and to guarantee interested third parties the possibility to join in the consultations either as co-Complainants (Art. 4.11 DSU) or as third parties (Art. 10 DSU).

[20] We do not account for the fact that a dispute often involves several Articles under each Agreement.

[21] Suppose a BD involves two product groups and three Agreements. We would then count this as six separate pairs (product group, Agreement) since we use a cross-tabulation in order to create Table 7. However, we do

Table 5. Distribution of complaints over sectors (percent)

		G4	Other OECD	Non-OECD non-LDC	All
Goods	Agricultural and Food	24.2	47.4	52.4	34.4
	Alcoholic Beverages	7.1			4.4
	General goods	14.1	15.8	4.8	11.9
	Machinery and Appliances	4.0	15.8		4.4
	Other Products	6.1	15.8		5.6
	Petrochemical			7.1	1.9
	Pharmaceutical	3.0			1.9
	Publications	1.0			0.6
	Raw and Semi-Finished	4.0			2.5
	Textiles	5.1		21.4	8.8
	Vehicles	10.1		4.8	7.5
	Total goods	**78.8**	**94.7**	**90.5**	**83.8**
Services	Communication	1.0			0.6
	Distribution	4.0	5.3	9.5	5.6
	General services	4.0			2.5
	Copyright and Rel. Rights	5.1			3.1
	Total services	**9.1**	**5.3**	**9.5**	**21.3**
Intellectual Property	Patents	6.1			3.8
	Trademarks	1.0			0.6
	Total IP	**12.1**	**0.0**	**0.0**	**23.1**
Total		**100**	**100**	**100**	**100**

A second observation that can be made from Table 6 is that the share of complaints involving the GATT is roughly the same for all country groups. The main differences across countries is in the invocation of other Agreements. For instance, the non-G4 OECD countries have relatively speaking more complaints under the Agriculture Agreement, and the Understanding on Dumping, than the G4 countries. The latter have in turn relatively more complaints under the Subsidies Agreement, and are also the only countries that have brought complaints under the TRIPS Agreement. These systematic differences could possibly have biased our results. Again, a closer investigation of these issues has to be left to future research.

not know whether all three Agreements have actually been invoked for both of the product groups. In order to avoid this problem, we only include BDs where one product group is involved.

Table 6. Distribution of complaints over Agreements (percent)

Agreement	G4	Other OECD	Non-OECD non-LDC	All
Agriculture	9.7	21.1	10.4	11.3
DSU	1.1			0.7
Dumping	1.7	18.4	2.6	4.1
GATS	4.0	2.6	5.2	4.1
GATT	34.1	34.2	39.0	35.4
Licencing	5.1	15.8	10.4	7.9
Rules of Origin	0.6		1.3	0.7
Procurement	1.7			1.0
Safeguards	1.1		2.6	1.4
SPS	7.4	2.6	1.3	5.2
Subsidies	10.2		3.9	7.2
TBT	7.4	2.6	7.8	6.9
Textiles	1.7		7.8	3.1
TRIMS	5.7	2.6	5.2	5.2
TRIPS	6.8			4.1
Valuation	1.7		2.6	1.7
Total	**100**	**100**	**100**	**100**

A third aspect in need of more attention is the link between private complaints over trade barriers and government actions, which is only rudimentary captured in the model. Since the WTO is a government-to-government contract that recognizes *locus standi* only to governments, private parties depend on its government's readiness to present their grievances before the WTO. As noted before, countries are likely to differ in this respect, with the EC and the United States being the two WTO Members with the most elaborate domestic mechanisms whereby private parties can draw attention to the trade barriers they face.[22] There is a need for a much more thorough understanding the domestic political process that determines whether complaints are brought to the WTO. For instance, one might hypothesise that more democratic countries systematically differ from more authoritarian countries in this respect.

[22] For a comparative presentation of the EC Trade Barriers Regulation and the US Section 301 legislation, see Mavroidis and Zdouc (1998).

Table 7. Distribution of complaints over invoked Agreements and sectors (%)

	Sector															
Agreement	Agriculture	Alcohol	Textiles	Machinery	Vehicles	Raw and semi	Petrochemicals	General goods	Other products	Distribution	Communication	Publications	Copy right	Patents	**Total (%)**	**Total (absolute)**
Agriculture	8.5							2.8							11.3	28
DSU					0.4			0.4							0.8	2
Dumping	0.8		0.8	1.2		0.4		0.4	1.2						4.9	12
GATS					0.4					0.8	0.4				1.6	4
GATT	15.8	2.8	3.6	2.8	3.2	0.8	1.2	5.7	1.6			0.4			38.1	94
Licencing	2.8						0.4	3.2	0.4						6.9	17
Origin	0.4		0.4												0.8	2
Procurement								0.4	0.4						0.8	2
Safeguards	0.4		0.4					0.4	0.4						1.6	4
SPS	5.3					0.4		0.4							6.1	15
Subsidies	1.6		0.8	0.4	2.8	0.4		1.2	0.4						7.7	19
TBT	5.7		1.2			0.4	0.8								8.1	20
Textiles			3.6												3.6	9
TRIMS	0.4				2.4										2.8	7
TRIPS													1.6	1.2	2.8	7
Valuation	1.6		0.4												2.0	5
Total (%)	43.3	2.8	11.3	4.5	9.3	2.4	2.4	15.0	4.5	0.8	0.4	0.4	1.6	1.2	100	
Total (abs.)	107	7	28	11	23	6	6	37	11	2	1	1	4	3		247

A fourth shortcoming of the analysis above is the fact that we have disregarded the issue of which country that file a complaint when the measure affect several exporters. Indeed, while the WTO rules allow for joint complaints, most disputes involve only one Complainant. If, as would seem likely, it is the largest country that pursues the dispute, then the system might in practice benefit smaller countries more than what might appear from their participation as Complainants, provided of course that the resolutions are MFN compatible.

Finally, we have sought to measure biases in the working of the DS system by comparing the actual and the expected number of complaints, given certain country characteristics. However, there are also other ways in which the system might be biased, for instance in the adjudication process itself. There is a suspicion that the influence of the major players is not quite captured by statistics on complaints alone. It can be noted that the G4 countries have not only been Complainants in 62 % of the BDs, but also Respondents in 55 % of the disputes. As a result, in 84% of the disputes they have been on one or both sides of the bar. Taking also into account their presence as Third Parties in consultations and panel proceedings, G4 countries have been able to make their voices heard in virtually every dispute that has been handled by the WTO. This should be set against the fact that the

majority of WTO Members have not been involved in any capacity in any dispute so far. It does not seem far-fetched to assume that this asymmetry between countries has left its mark on the operation of the DS system. We intend to examine these issues more thoroughly in the future.

7. Concluding remarks

The larger trading nations have been the main users of the WTO Dispute Settlement System during the first four years of its existence. The new DS system is in this regard no different from its predecessor (GATT).[23] The fundamental question is, however, whether this dominance simply is a reflection of the fact that these countries encounter more questionable trade or trade-related measures than other countries, or whether it mirrors other factors, such as different legal capacities, or some form of exploitation of "power". The analysis above is, to the best of our knowledge, the first attempt to examine this issue statistically. Our tentative general conclusion is that the seeming over-representation by G4 countries, or the mirror image under-representation of developing countries, to a large extent reflect differences in the diversity and value of trade. However, as pointed out in the previous Section, these conclusions rest on a number of restrictive assumptions. More research is needed before we can draw more definite conclusions.

[23] Hudec *et al*. (1993) observed that larger and richer countries tended to be more active as Complainants than smaller and poorer countries in the GATT system.

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APPENDIX

A.1 Modifications of the WTO Dispute Series

The following list provides details on how WTO disputes have been deleted or reclassified in the construction of our data base ("DS" here refers to the WTO Dispute Series):

a) DS3 (Korea - Measures concerning the testing and inspection of agricultural products): Omitted since this case self died and was subsequently reopened as DS41 with wider set of Articles invoked.
b) DS16 (EC – Regime for the importation, sale and distribution of bananas): Omitted since this case self died and was subsequently reopened as DS27 with wider set of Articles invoked, and with an additional Complainant (Ecuador).
c) DS37 (Portugal - Patent protection under the Industrial Property Act): Treated as case against EC with same DS number.
d) DS52 (Brazil - Certain measures affecting trade and investment in the automotive sector): Omitted since reopened with a larger set of complaints as DS65.
e) DS55 (Indonesia - Certain measures affecting the automobile industry): Omitted since reopened with a larger set of complaints as DS64.
f) DS67 (United Kingdom - Customs classification of certain computer equipment) and DS68 (Ireland - Customs classification of certain computer equipment): Omitted since the EC has competence concerning the implementation of EC tariff schedules. That is, these two cases are incorporated with DS62 (EC - Customs classification of certain computer equipment).
g) DS71 (Canada - Measures affecting the export of civilian aircraft): Omitted since Brazil decided to pursue DS70 concerning the same measures but under a different article of the Subsidies Agreement (prohibited instead of actionable subsidies).
h) DS74 (Philippines - Measures affecting pork and poultry): Omitted since same measures plus some corrective measures appeared again in DS102. Both cases settled at same date.
i) DS80 (Belgium - Measures affecting commercial telephone directory services): Omitted and reclassified as US-EC case with same DS number.
j) DS82 (Ireland - Measures affecting the grant of copyright and neighbouring rights): Omitted since treated as case against EC, DS115 (European Communities - Measures affecting the grant of copyright and neighbouring rights).
k) DS83 (Denmark - Measures Affecting Enforcement of Intellectual Property Rights) and DS86 (Sweden - Measures Affecting Enforcement of Intellectual Property Rights): Omitted since treated as one case against EC. Given the DS number DS83.
l) DS85 (United States - Measures affecting textiles and apparel products): Omitted, since the case continued as DS 151 concerning the implementation of the bilateral settlement in DS85.
m) DS87 (Chile - Taxes on alcoholic beverages): Omitted since the case continued as DS110 concerning the modifications of the initial regime there were addressed in DS87.
n) DS101 (Mexico- Anti-dumping investigation of high-fructose corn syrup (HFCS) from the United States): Omitted since the same case, somewhat extended in scope, and on the other hand, directed at two more specific products, appeared as DS132.
o) DS106 (Australia - Subsidies provided to producers and exporters of automotive leather): Omitted since case continued with broader scope as DS126. Same panel dealt with both cases.
p) DS125 (Greece - Enforcement of Intellectual Property Rights for motion pictures and television programs): Omitted treated as EC case DS124.
q) DS127-131 (Belgium - Certain income tax measures constituting subsidies, etc): Treated as one case against EC with DS number DS127.

We want to exclude disputes that concern an action that is solely felt within the Complainant's domestic market. Disputes where the alleged effect appears in both the domestic, and to a significant extent in the Complainant's third export markets, should be retained in the data, due to due to the latter effects. The following two WTO disputes were omitted on these grounds:

a) DS107 (Pakistan - Export measures affecting hides and skins): Quantitative restriction on the export side that presumably mainly had negative effects on EC domestic market.

b) DS152 (United States - Sections 301 - 310 of the Trade Act of 1974): The EC were requested to open its banana market faster than it desired. Hence, refers to EC import interest.

Finally, the following disputes have been retained:

a) DS44 (Japan – Measures affecting consumer photographic film and paper) and DS45 (Japan - Measures Affecting Distribution Services) are maintained as separate cases, since DS44 refers to specific measures for a particular product, while DS45 concerns general measures affecting distribution services.

b) We have assumed that TRIPS disputes in practice always affect export interests of the Complainant to at least some extent, and have therefore retained these cases in the data set. Similarly, since all TRIMs disputes are classified as affecting the Respondent's domestic market, they affect the export interest of the Complainants.

A.2 GNP and GNP per capita

The series for GNP and GNP/cap are taken from the World Development Indicators 1998. In both cases we try to calculate the average for the years 1994-96, or the closest available.

GNP is measured at market value in $US. However, because of lack of data we use GDP measured at PPP, as reported on the Central Intelligence Agency's Web site, for the following countries: Cuba, Djibouti, Dominica, Macau, Myanmar, and Surinam.

GNP/cap is measured according to the Atlas method. Hence, GNP is calculated in national currency and is usually converted to U.S. dollars at official exchange rates, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. The series lack values for Brunei Darussalam, Cuba, Djibouti, Kuweit, Macau, Myanmar and Tanzania, and for these countries we instead use GNP/cap at PPP as taken from the CIA Web site.

Table A1. Percentage distribution of BDs and PMPs across countries

	Thresholds					Thresholds			
	BDs	**$1k**	**$1m**	**$10m**		**BDs**	**$1k**	**$1m**	**$10m**
Angola	0.0	0.03	0.03	0.04	Macau	0.0	0.24	0.12	0.14
Antigua and Bar.	0.0	0.06	0.01	0.01	Madagascar	0.0	0.11	0.03	0.02
Argentina	1.4	1.60	1.33	1.01	Malawi	0.0	0.10	0.04	0.03
Australia	1.4	2.82	2.35	1.62	Malaysia	0.7	2.42	2.37	2.33
Bahrain	0.0	0.16	0.07	0.09	Maldives	0.0	0.03	0.01	0.00
Bangladesh	0.0	0.19	0.20	0.16	Mali	0.0	0.07	0.02	0.01
Barbados	0.0	0.19	0.02	0.01	Malta	0.0	0.13	0.08	0.08
Belize	0.0	0.05	0.01	0.01	Mauritania	0.0	0.04	0.01	0.02
Benin	0.0	0.04	0.02	0.02	Mauritius	0.0	0.27	0.09	0.06
Bolivia	0.0	0.19	0.09	0.08	Mexico	2.7	2.16	1.80	2.02
Brazil	3.4	3.02	2.92	2.09	Mongolia	0.0	0.04	0.02	0.01
Brunei Darussalam	0.0	0.10	0.03	0.04	Morocco	0.0	0.43	0.25	0.22
Bulgaria	0.0	0.70	0.43	0.23	Mozambique	0.0	0.08	0.02	0.01
Burkina Faso	0.0	0.03	0.02	0.01	Myanmar	0.0	0.15	0.11	0.08
Burundi	0.0	0.02	0.01	0.01	New Zealand	2.7	1.34	0.89	0.66
Cameroon	0.0	0.15	0.06	0.05	Nicaragua	0.0	0.18	0.05	0.03
Canada	8.8	3.29	2.68	3.47	Niger	0.0	0.06	0.01	0.01
Central African Rep.	0.0	0.05	0.01	0.00	Nigeria	0.0	0.24	0.09	0.12
Chad	0.0	0.02	0.01	0.01	Norway	0.0	1.70	1.02	0.97
Chile	1.4	1.18	0.73	0.55	Pakistan	0.7	0.69	0.46	0.38
Colombia	0.7	1.18	0.71	0.38	Panama	0.7	0.18	0.07	0.05
Congo	0.0	0.07	0.02	0.02	Papua New Guinea	0.0	0.10	0.06	0.09
Costa Rica	0.7	0.54	0.24	0.10	Paraguay	0.0	0.15	0.08	0.05
Côte d'Ivoire	0.0	0.19	0.12	0.12	Peru	0.7	0.60	0.29	0.27
Cuba	0.0	0.14	0.07	0.06	Philippines	1.4	0.92	0.71	0.56
Cyprus	0.0	0.23	0.06	0.02	Poland	0.7	0.68	1.03	1.00
Czech Republic	0.0	1.98	1.62	1.32	Qatar	0.0	0.09	0.05	0.08
Dem. Rep. of Congo	0.0	0.08	0.04	0.05	Romania	0.0	0.76	0.60	0.35
Djibouti	0.0	0.02	0.00	0.00	Rwanda	0.0	0.02	0.01	0.00
Dominica	0.0	0.11	0.01	0.01	St Kitts and Nevis	0.0	0.02	0.00	0.00
Dominican Republic	0.0	0.26	0.15	0.18	St Lucia	0.0	0.06	0.01	0.00
Ecuador	0.7	0.38	0.18	0.15	St Vincent & the Gren.	0.0	0.04	0.01	0.01
Egypt	0.0	0.44	0.18	0.17	Senegal	0.0	0.10	0.04	0.03
El Salvador	0.0	0.35	0.14	0.03	Sierra Leone	0.0	0.08	0.01	0.01
EC	26.4	13.75	24.41	28.02	Singapore	0.7	3.94	4.13	3.75
Fiji	0.0	0.11	0.05	0.04	Slovak Republic	0.0	0.91	0.83	0.56
Gabon	0.0	0.05	0.03	0.05	Slovenia	0.0	0.79	0.52	0.47
Gambia	0.0	0.04	0.01	0.00	Solomon Islands	0.0	0.03	0.02	0.01
Ghana	0.0	0.14	0.07	0.05	South Africa	0.0	2.95	1.66	0.90
Grenada	0.0	0.03	0.01	0.00	Sri Lanka	0.7	0.56	0.29	0.24
Guatemala	0.7	0.50	0.23	0.07	Suriname	0.0	0.04	0.01	0.03
Guinea	0.0	0.05	0.03	0.02	Switzerland	2.0	4.50	3.44	2.92
Guinea Bissau	0.0	0.02	0.01	0.01	Tanzania	0.0	0.15	0.08	0.04
Guyana	0.0	0.11	0.04	0.02	Thailand	2.7	3.02	2.67	2.42
Haiti	0.0	0.06	0.03	0.01	Togo	0.0	0.05	0.02	0.02
Honduras	0.7	0.20	0.04	0.02	Trinidad and Tob.	0.0	0.51	0.17	0.10
Hong Kong, China	0.7	1.59	1.05	0.85	Tunisia	0.0	0.32	0.23	0.23
Hungary	1.4	1.25	0.86	0.63	Turkey	0.0	1.67	1.09	0.82
Iceland	0.0	0.13	0.07	0.08	Uganda	0.0	0.06	0.03	0.02
India	5.4	3.47	2.02	1.20	United Arab Em.	0.0	1.04	0.38	0.34
Indonesia	0.7	1.96	1.88	1.73	United States	23.6	8.96	14.35	16.42
Israel	0.0	1.28	1.03	0.80	Uruguay	0.7	0.35	0.24	0.12
Jamaica	0.0	0.23	0.06	0.04	Venezuela	0.7	0.71	0.41	0.28
Japan	3.4	5.17	7.75	10.53	Zambia	0.0	0.15	0.05	0.04
Kenya	0.0	0.56	0.18	0.07	Zimbabwe	0.0	0.56	0.19	0.10
Korea	1.4	3.60	4.24	4.10	Zimbabwe	0.0	0.56	0.19	0.10
Kuwait	0.0	0.31	0.05	0.03	**Sum**	**100**	**100**	**100**	**100**
Kyrgyz Republic	0.0	0.03	0.01	0.00	Total BDs & PMPs	146	585378	109901	30248