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Substitution Effect?**

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Abstract

Many nations have undergone significant trade liberalization in the last twenty years even as they have increased their use of contingent protection measures. This raises the question of whether some of the trade liberalization efforts, at times accomplished through painful reforms, have been undone through a substitution from tariffs to non-tariff barriers. Among the new forms of protection, antidumping is the most relevant, as its use has spread from few developed countries to a large set of developing countries that are now among the most intense users of this instrument. This paper uses a newly developed database to examine to what extent the use of antidumping in a large set of countries is systematically influenced by the reduction of applied sectoral tariffs. The data set includes information on 29 developing and 7 developed countries from 1991 through 2002. After controlling for time-varying sectoral information as well as macroeconomic conditions, we find evidence of a substitution effect only for heavy users of antidumping among developing countries. In particular, a one standard deviation increase in sectoral trade liberalization increases the probability of observing an antidumping initiation by 32 percent. There is no similar statistically significant result for other developing countries or developed countries. We also find robust evidence of retaliation and deflection effects as determinant of antidumping filings across all subsamples.

Keywords: Trade Liberalization, Antidumping

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I. Introduction

The world's trading nations have undertaken an unmistakable effort to reduce trade barriers over the last few decades. Serious efforts to lower tariffs began in North America, Europe and Japan in the immediate post-war decades. Many developing countries followed suit in more recent years, especially during the 1980s and 1990s. These efforts have resulted in significantly lower trade restrictions the world over.

There has been another distinct pattern that coexists with these liberalization episodes. In particular, nations all over the world have also begun to use administered protection procedures on selected import categories. The most important of these is the remarkable spread of antidumping duties, first in a small group of developed nations (the U.S., the E.U., Australia, Canada, and New Zealand – i.e., the so-called traditional users) and then to a widening array of nations across the world.

In many instances, one can point to a particular pattern. Nations begin a process of liberalization, tariffs are reduced, and then antidumping procedures begin take on a more pronounced role in the trade policy of these countries. Such patterns occurred in the United States where average tariffs fell sharply in the 1950s through 1970s and were followed by a surge in the use of antidumping measures in the 1980s and onward.¹ Mexico underwent a structural change in trade policy in the early 1980s that was followed subsequently by wider antidumping usage. More recently, India experienced a remarkable trade liberalization in the 1990s but has since become the world's heaviest user of antidumping procedures.

At an aggregate level, Figure 1 is indicative of a substitution effect between tariffs

¹ Irwin (2005) also shows that there was frequent use of antidumping in the 1950s and 1960s.

and antidumping initiations, at least for the set of developing countries used in this paper (i.e., Panel B). In fact, while the simple correlation for developed countries in Panel A is positive (i.e., 0.48) it is equal to -0.55 for developing countries. These stylized facts raise an obvious question. To what extent have domestic industries tried to use antidumping to replace recent tariff reductions at the sectoral level.

The substitution of antidumping for tariffs has clear benefits for many of the actors involved in trade policy. Governments committed to broad reductions in trade restrictions may face subsequent pressures from affected industries and import competing industries have a place to turn to in the event of economic distress. Antidumping procedures can play an important role in dealing with that pressure for protection. WTO rules allow governments to impose antidumping duties beyond most-favored-nation tariffs when an administering agency determines that foreign firms have “dumped” products (i.e., exported below cost or below home price) in the domestic market and that dumping has caused “material injury” to the domestic industry. Thus, antidumping rules are an administratively determined process of protection on a narrow set of products.

Although this potentially beneficial role for antidumping is often emphasized by antidumping supporters, there is a risk that the antidumping system could be used to neutralize (part of) the gains of trade liberalization. Despite its importance, there is only a small, but growing, literature on the relationship between antidumping and trade liberalization. Moore and Zanardi (forthcoming) focus on one aspect of this relationship. In particular, they look at whether past antidumping use allowed developing countries to engage in more trade liberalization. The empirical analysis of the “safety valve” role of antidumping (i.e., that protectionist pressures can be contained and channeled into

antidumping while a broader trade liberalization campaign can continue) finds no systematic evidence of such a role in the data for a sample of 23 developing countries. Finger and Nogués (2005) consider a similar question and analyze the role of administered protection (i.e., antidumping and safeguard actions) in the Latin American experience with trade liberalization. Their interviews and case studies lead them to conclude that these measures were a useful tool in dealing with protectionist pressures for even more drastic action.

A related strand of this literature is represented by recent work by Feinberg and Reynolds (2007) and focuses on whether past trade liberalization results in an increased use of antidumping. In particular, they analyze whether trade liberalization commitments (i.e., changes in bound tariffs) in the Uruguay Round are associated with an increased probability of antidumping petitions in 24 countries for the period from 1996 to 2003, including 17 developing nations. They find evidence that trade liberalization is associated with increased antidumping use in developing countries. Instead, for traditional users of antidumping, increased liberalization results in less use of antidumping. Bown and Tovar (2008) conduct a similar analysis focusing on India, which has recently become one of the heaviest users of antidumping after going through significant trade liberalization reforms in the early 1990s. Their results suggest that Indian liberalization efforts have resulted in higher probability of antidumping filings.

In this paper, we examine the relationship, if any, between sectoral trade liberalization and subsequent antidumping use in a sample of 29 developing countries and 7 developed countries over the period 1991-2002. As in Feinberg and Reynolds (2007), we focus on the relationship between reduction in tariffs and the probability of observing

the initiation of an antidumping petition. Our unit of observation, like theirs, is the probability of observing an antidumping petition between two countries in a particular industry.

However, our paper differs from their paper in three important ways. First, we analyze *applied* tariffs rather than *bound* tariffs. Thus, we are investigating whether trade policies actually in place affect antidumping behavior rather than the role of promised maximum (i.e. bound) tariff rates promised in international negotiations. This distinction between bound and applied tariffs is especially important for developing countries, which often have very large “tariff overhangs” (i.e., the difference between applied and bound tariffs). Second, we control for other factors that the literature has found important in predicting antidumping initiations. These include macroeconomic conditions in the importing country as well as time-varying industry effects (at the 3-digit ISIC level). Finally, we use a newly developed antidumping database by Moore and Zanardi (forthcoming) that is supplemented with information from Bown (2006). This data set is based on primary government sources rather than WTO submissions, the latter of which can have important deficiencies of coverage and accuracy.²

We find that tariff reductions lead to higher probability of antidumping use but only for developing countries that are intensive users of antidumping. This result does not hold for other developing countries nor for developed countries. Controlling for other determinants of antidumping filing allows us to provide robust and consistent evidence of retaliation and deflection effects, as well as of macro and micro (i.e., industry level) influences on the decision to file an antidumping case.

² Other differences include a larger set of importing countries, a much larger set of exporters, a longer time span, and more disaggregate industrial sectors.

The paper is organized in the following way. We first provide a brief overview of relevant literature in Section II. Section III discusses the data and econometric strategy. We turn to the econometric results and their economic significance in section IV. Concluding remarks are included in section V.

II. Literature review

The economic literature on antidumping has a long history that cannot be summarized here.³ On top of the studies already mentioned in the introduction, this paper expands on two distinct strands of the empirical antidumping literature.⁴

The first set of papers examines the determinants of antidumping initiations. For many years the focus has been on the traditional users of antidumping measures. Feinberg (2005) focuses exclusively on filing behavior of U.S. firms and finds that an appreciating domestic currency and falling GDP growth rates lead to higher incidence of filings. Knetter and Prusa (2003) analyze filing patterns within four major traditional users of antidumping and find similar results.⁵

More recently, focus has turned towards examining a broader group of countries as antidumping use extends beyond the traditional users. Francois and Niels (2006) focus their attention on Mexico exclusively and analyze business cycle effects on Mexican antidumping filings and also find that exchange rate appreciation increases the probability

³ Prusa and Blonigen (2003) provide a broad survey of the theoretical and empirical literature.

⁴ We are aware of only one theoretical paper that analyzes why countries would switch from tariffs to antidumping duties. Anderson and Schmitt (2003) show that a government might prefer to use antidumping (or quotas) if international commitments prevent it from using tariffs. Unfortunately, this insight does not provide much guidance for the empirical analysis undertaken in this paper.

⁵ Leidy (1997) also finds similar results using a much smaller sample of U.S. aggregate filings. Instead, Feinberg (1989) reaches an opposite conclusion with regard to the role of exchange rate movements (i.e., a depreciation of the U.S. dollar leads to more filings) when analyzing U.S. antidumping filings in the early 1980s. Feinberg (2005) suggests that the inconsistency in the results on the exchange rate is only apparent and due to learning on the part of petitioners about the way the U.S. administration operates.

of a filing. They also find that an increase in the current account deficit or a decrease in manufacturing sector growth increases the probability of observing an antidumping petition. Bown (2008) looks in detail at the filing decisions in nine new major users of antidumping and exploits sectoral variation in economic conditions to help explain filing behavior as well as final AD outcomes. He finds that changing market conditions related to the WTO rules on antidumping as well as political economy considerations play an important role.⁶

Another strand of the literature examines how “retaliation” and trade “deflection” can influence AD filings. Prusa and Skeath (2002) consider whether strategic considerations help explain antidumping filings from 1980 through 1998 in addition to economic considerations for long-standing users of AD as well as new developing country users. They conclude that while economic factors (such as import surges) matter, those countries filing antidumping petitions may also consider whether the trading partner may react by imposing its own contingent protection. Blonigen and Bown (2003) use a nested logit approach to exam in detail whether the potential for foreign retaliation can affect the probability that an antidumping case will be filed in the U.S. for the 1980 to 1998 period. Among other findings, they provide evidence that strategic considerations, in particular the share of U.S. exports in the potential target country, can influence the decision to file a case. Bown and Crowley (2007) consider how AD filings in the U.S. against Japanese exports from 1992 to 2001 affected third markets, an effect that they call trade “deflection.” They find strong evidence of such an effect, which raises the possibility that other countries’ industries might react by filing their own antidumping

⁶ Bown (2008) faces our same data limitations when controlling for sector specific economic conditions. This explains why he only analyzes nine countries.

petitions. Feinberg and Reynolds (2006) consider a broader group of countries that includes new users to analyze retaliation motives for the 1995-2003 period. They find evidence in this broader set of countries that retaliation for past antidumping cases and trade deflection can influence filing behavior: deflection plays a role in new and traditional users but retaliation considerations are important only for the former.

These papers certainly suggest that it is important in the empirical analysis to control for macroeconomic and sectoral conditions, as well as for other determinants of antidumping filings. Although the primary focus of this paper is whether trade liberalization (as defined by reductions in sectoral applied rather than bound tariffs) can influence antidumping filings, we also contribute to the literature reviewed above by providing a unified framework to analyze the various channels (i.e., retaliation, trade deflection, micro and macroeconomic factors) that have been found to influence filings.

III. Econometric Methodology and Data

We analyze the determinants of the probability of observing the initiation of an antidumping petition in a given industrial sector for a particular pair of trading countries. The basic econometric strategy for the paper is straightforward. A domestic industry has some utility associated with its current economic condition that is negatively correlated with economic pressures from import sources. If this utility falls below some minimum level, the firms in the industry may decide to file an antidumping petition. However, we do not observe the level of utility but only whether a petition is filed in country i against country j in sector k . A natural model is to use a probit framework:

$$P(y_{ijkt} = 1) = \Phi(\alpha + \beta_1 \tau_{ikt-1} + \beta_2 T_2 \rho_{ijkt-1} + \beta_3 \sigma_{ikt-1} + \beta_4 \mu_{it-1}) \quad (1)$$

where y_{ijkt} takes on a value of 1 if an antidumping petition is filed by importing country i against trade partner j in sector k in year t and $\Phi(\cdot)$ is the cumulative normal distribution. Information about country i 's sectoral applied tariffs (including changes and levels) is included in the vector τ_{ik} . The possibility of retaliation between the importing and exporting country pairs as well as measures for deflection are included in ρ_{ijk} . We also control for sectoral conditions in country i in sector k in the matrix σ_{ik} . Data on the macroeconomic conditions in the importing country are included in the matrix μ_i . The nature of these cases is that there are unobservables that cannot be accounted for. Consequently, we include industry and year fixed effects in the estimation procedures. Note that in all the specifications each regressor is lagged one period from the year in which the probability of an initiation is assessed since antidumping authorities look at past performance to decide on the merit of a filing (and petitioners take this aspect into account when deciding whether to file or not a case).⁷

Our sample consists of 7 developed and 29 developing countries for the 1991-2002 time frame. The basic unit of observation is whether a petition is filed in each of the 29 (3-digit ISIC) manufacturing sectors in a particular importing country against an exporter. Data on antidumping has been collected by the authors and supplemented with information from Bown (2006) while tariff data come from the World Bank Trade and

⁷ The lag of the trade liberalization variable also attenuates a potential endogeneity problem whereby (past or prospective) use of antidumping may make trade liberalization more likely (i.e., antidumping as a “safety valve”). Two other factors reduce the potential for endogeneity problems. First, Moore and Zanardi (2007) show that past use of antidumping actually deters further trade liberalization in a sample of developing countries very similar to the one employed in this paper. This suggests that smaller tariff changes may result in fewer antidumping initiations since trade protection is, *ceteris paribus*, higher so that our results will represent a conservative estimate of the overall link between trade liberalization and antidumping use. Second, if antidumping works as a safety valve so that trade liberalization takes place because of the possibility of antidumping protection, we should clearly detect a positive relationship between tariff cuts and initiations of antidumping petitions.

Production database (Nicita and Olarreaga, 2007).⁸ Sectoral trade data are extracted from WITS and are available for almost 180 exporting partners of the 36 countries in our sample. Macroeconomic variables are from standard sources (i.e., the IMF's International Financial Statistics and the World Bank's World Development Indicators).

We include only those countries that have an antidumping law in place in the years under analysis. Furthermore, we split the sample into developing and developed countries because of the widely varying experience with antidumping. Table 1 includes some basic information about the importing countries analyzed in the study along with their use of antidumping vis-à-vis the set of exporters included in the sample and the average trade liberalization in the data set. It is no surprise to see quite a huge variation in the use of antidumping among developing countries with the usual suspects among the developing countries emerging as heavy users (e.g., Argentina, Brazil, India) and the traditional users confirming their reputation.⁹ In our data set, approximately 0.85 percent of the country-sector-year observations for the developed countries actually record the filing of an antidumping petition. The analog for developing countries is even smaller at 0.50 percent. This means that antidumping petitions remain a rare occurrence in international trade relations.¹⁰

Table 1 also reports the average trade liberalization in sectoral applied tariffs that occurred over the sample period (where trade liberalization is defined as a positive percentage change). On average developed countries have liberalized more than their

⁸ Availability of tariff data determines the sample of countries included in the analysis.

⁹ New Zealand filed fewer petitions in our sample period than in previous years.

¹⁰ Antidumping's effect on overall international trade flows is still an open question. Vandenbussche and Zanardi (2006) find that antidumping has had an important impact on trade, even in sectors not directly involved in antidumping petitions, especially in the developing world. Egger and Nelson (2007) find negative, but modest, impacts in their analysis.

developing country counterparts although they started from much lower applied rates at the beginning of the sample.

Table 2 includes a list of variables used in the study with the expected signs in the regressions and the variables' definitions.¹¹ As expressed in (1), regressors can be divided into four basic types. All the regressors are lagged one period from the year in which the probability of an initiation is assessed. In the following descriptions, the “base year,” or t , is this one year lag.

The first set of regressors includes measures of trade liberalization, which are the primary variables of interest for this study, as well as the level of applied tariffs before the liberalization takes place. Trade liberalization (TRADE_LIB) is defined as the percentage change in 3-digit ISIC sectoral applied tariffs. We include two versions. TRADE_LIB2 is the change over two periods (i.e., from $t-2$ to t) while TRADE_LIB3 is the change over three years (i.e., from $t-3$ to t).¹² Note that we define a drop in tariffs as a positive number. Consequently, we would expect to see a positive coefficient for either version of this variable if trade liberalization induces firms to respond by filing an antidumping suit to “recreate” a level of protection earlier in place. We also control for the initial level of sectoral tariffs by including TARIFF_LEVEL, which is the base year unweighted average applied tariff rates for the sector. A positive coefficient for this variable might indicate that sectors that had been able to avoid trade liberalization in the past, perhaps through political pressure, might be more likely to try to access the antidumping process to obtain protection in the future. A negative coefficient could

¹¹ Some descriptive statistics are provided in Table 7 along with the economic significance of the results.

¹² Note that we excluded observations if TRADE_LIB was extremely large. In particular, we excluded observations with TRADE_LIB larger than 1500% and 780% for developed and developing countries, respectively, which reflected natural breaks in the data.

suggest that sectors with higher tariff barriers do not need to use antidumping since they already enjoy high protection.

The second set of explanatory variables controls for two types of responses (i.e., retaliation and deflection) to third country antidumping activities.

Following the literature on the role of retaliation as a determinant of filings, we consider the number of antidumping initiations launched against the importing country by a particular exporting country in the same sector under analysis (RETALIATION_INIT). For example, if we were analyzing the probability that the U.S. steel industry would initiate an antidumping petition against Mexico in 2000, this variable would reflect the number of Mexican antidumping petitions filed against U.S. steel firms in 1999.

RETALIATION_MEAS is the analog but includes the number of antidumping measures actually imposed. We expect the coefficients on these regressors to be positive if the importing countries' firms act to punish their foreign competitors for using the antidumping process. The two variables do reflect slightly different relationships. The former indicates the possibility of a final antidumping order and would likely have a smaller effect than the latter, which would indicate that the foreign government in fact has acted to limit imports of the product. Other versions of retaliation are RETALIATION_INIT_COUNTRY and RETALIATION_MEAS_COUNTRY, which are calculated at the country level and defined as the number of initiations or measures received by an importer from a particular trade partner in *any* sector. It is perhaps less clear why the importing industry should care about antidumping petitions involving other sectors but this variable has been used in previous papers so we include it here.

In order to assess the relevance of trade deflection, we include variables that

reflect the potential diversion of trade from other countries as a result of antidumping actions. DEFLECTION_INIT (DEFLECTION_MEAS) is the number of antidumping initiations (measures) world-wide (exclusive of the importing country) for the specific sector analyzed. We expect that the coefficients on these two regressors would be positive; as other nations initiate or impose antidumping measures in a sector, domestic firms will face more pressure from diverted imports and hence are more likely to initiate their own antidumping petitions. Instead, DEFLECTION_INIT_AGG and DEFLECTION_MEAS_AGG are the count of the initiations and measures in *any* sector in all the countries so that they reflect the possibility of increased exports of various products to the importing country.

WTO rules also require certain criteria to be met in order to impose antidumping duties, including evidence of injury to a domestic industry producing a similar product. One measure of such potential injury is a growing or large import presence. To control for these considerations, we include IMPORT_GROWTH, which is the bilateral percentage change in sectoral imports from $t-1$ to t . We expect that the more imports have grown over this period from a particular trading partner, the more likely an antidumping petition will be filed, that is, the coefficient on this variable is expected to be positive. We also control for the share of imports (IMPORT_SHARE) from the potential “target” country in a given sector. All else equal, we expect that an industry is more likely to file a case against countries with a larger import market share in this sector.

We would prefer to have other disaggregated measures of the economic condition of the domestic industry that might reflect material injury. Unfortunately, a systematic and comprehensive database for economic conditions for industrial sectors is not

available across all countries and time periods. Some data are available from the World Bank's Trade and Production Database. In some specifications, we include some of these data in the analysis: `OUTPUT_CHANGE` and `EMPLOYMENT_CHANGE` are the percentage change in sectoral nominal output and total sectoral employment from t to $t-1$. We expect that falling production or employment will increase the likelihood of a petition so that the expected sign for the coefficients are negative. The downside to the inclusion of these variables is that it reduces the number of observations because of missing data. As a sensitivity test, we will report results when these variables are included.

Finally, we control for various macroeconomic variables that might affect the decision to file.

`EXCHANGE_RATE` is the bilateral exchange rate between the importing and exporting country pairs at time t , where a lower value represents a higher value of the domestic currency in terms of their trading partner's currency. As Knetter and Prusa (2003) point out, there is theoretical ambiguity about how a currency's value should affect the incentives for filing. However, the empirical studies cited above consistently find that a stronger currency is associated with increased use of antidumping so that we expect a negative value for the coefficient.

We also include broad macroeconomic effects by computing three year averages (for years t , $t-1$, and $t-2$) of `GROWTH`, `INFLATION`, and `CURRENT_ACCOUNT`, which are annual real GDP growth, inflation, and current account balances (as a percentage of GDP), respectively. We expect that unstable economic conditions would result in higher probability of petitions so that the coefficients on `GROWTH` and `INFLATION` should be negative and positive, respectively. We also expect that the

coefficient on CURRENT_ACCOUNT should be negative if firms believe that a higher level of imports would make a government more likely to impose antidumping duties. Finally, we include real GDP per capita (GDP_PC) as a measure of economic development within the country. We expect a positive coefficient for this variable.

It is worth discussing briefly how this set of variables compares with that of Feinberg and Reynolds (2007), which is the paper most closely related to our study. The most important difference is the control for trade liberalization. Feinberg and Reynolds use the (time unvarying) promised bound tariffs changes agreed at the Uruguay Round interacted with a log-trend to capture the dynamic phasing in of potential changes. We focus instead on the time series of actual applied tariffs for each year of analysis. The difference is important for two reasons. First, bound tariffs reflect the highest possible rate consistent with multilateral commitments while applied tariffs are the ones that firms actually face in practice.¹³ Second, we want to exploit the actual time variation in tariffs to explain antidumping decisions. Feinberg and Reynolds do so by interacting the promised change in the level of bound tariffs with a log trend since a time series of bound tariffs is not available to the public. We use the statutory levels of sectoral tariffs instead, which are reported to the public.

We also explore more channels for retaliation than in this earlier study. Feinberg and Reynolds use a measure of whether a case was filed in the exporting country against the importing country in the previous year, regardless of the industrial sector. We use this measure but also control for whether a case was filed in the same sector. We believe that the latter is particularly important since it is not immediately clear why a domestic

¹³ The difference between the two is quite large across sectors for the developing countries included in our analysis, less for the developed countries (see WTO, 2007).

industry should care whether another sector was targeted by a foreign country. We also include measures actually imposed rather than focus only on initiations. Feinberg and Reynolds include the trade level for imports in 1999 (i.e., the middle year of their sample). We rely instead on time varying measures of imports: 1) the change in imports for the particular sector; and 2) the exporting country's share of the domestic country's imports of the industry in question. Unlike Feinberg and Reynolds, we also include macroeconomic regressors in the analysis as well as time-varying economic conditions such as employment and output.

IV. Econometric results

Estimation results are included in Tables 3 through 6. All displayed estimates in these tables are the marginal probability effects of a change in the explanatory variable (or a discrete change for dichotomous regressors). All regressions include year and industry fixed effects to control for unobserved (non-time varying) factors in the data but these coefficients are not reported to save on space.¹⁴ We also provide a systematic discussion of the economic significance of the results in the next section. These results are displayed in Table 7 along with descriptive statistics for the regressors.

We report specifications for developed and developing countries separately as a result of (non-reported) estimations that strongly indicated systematic differences in the two subsamples. Moreover, from the summary statistics in Table 1 we can single out some developing countries that are heavy users of antidumping and we will investigate the robustness of the results for developing countries when focusing on a sub-sample of

¹⁴ All results not reported are available upon request.

heavy users (i.e., Argentina, Brazil, India, Mexico, Peru, and South Africa).¹⁵ The first three tables contain the estimation results when we do not use the World Bank's Trade and Production Database information for developed and developing countries, respectively. Table 6 shows the econometric results when sectoral output and employment changes are included as regressors.

The various specifications in each table include different versions of the main variable of interest (i.e, trade liberalization) or of control variables for deflection and retaliation effects. One potential problem with our sample is that countries that have an antidumping law in place but have never used it may have a structurally different probability of observing an initiation than a country that has seen at least some antidumping activity. Thus, the last column in Tables 3 and 4 reports the results as for the regression in the first column but including only countries that have initiated at least one antidumping initiation in the sample period.¹⁶

Since the primary focus in this paper is on whether there is evidence of a substitution effect between trade liberalization and filing of antidumping petitions, we focus on the trade liberalization variables first. In Table 3, we see no evidence that such a dynamic substitution is occurring for developed countries in the sample period. Recent changes in applied tariffs do not seem to influence the decision to file an antidumping petition in any of the specifications. This holds for both the two- and three-year versions of the trade liberalization measures (TRADE_LIB2 and TRABLE_LIB3). This result represents a difference from Feinberg and Reynolds (2007), who report the unexpected result that the coefficient for “traditional users,” which is very similar to our subsample of

¹⁵ Among developing countries, these countries have initiated more than twice the average number of petitions; similarly, their average annual number of initiations is twice the average of the sample.

¹⁶ Norway and 11 countries are dropped from the developed and developing country samples, respectively.

developed countries, is negative and significantly different from zero at a 10 percent level.¹⁷ In their sample, this suggested that industries that are faced with less trade liberalization are more likely to see antidumping initiations.

There is also no evidence that sectors with high tariff levels are more likely to file an antidumping petition in developed countries; the coefficient on `TARIFF_LEVEL` is always positive but never significant.

The results for the entire sample of developing countries (displayed in Table 4) suggest once again that a reduction in applied tariffs does not prompt later antidumping initiations in developing countries. However, when focusing only on the heavy users of antidumping in Table 5, we see strong evidence that such a substitution effect may be at play: all the specifications reported in that table show that the coefficients for `TRADE_LIB` (both the two and three-year versions) are positive and significant at the 1 percent level. These results for a broad group of developing countries that are heavy users is consistent with Bown and Tovar's (2008) study of antidumping use in India. We also see indications that a higher sectoral tariff level is consistently associated in a statistically significant way with a higher incidence of antidumping use in both developing country samples, in contrast with the lack of explanatory power for this variable among developed countries.

In short, we see evidence that applied tariff *changes* are a motivating factor behind filing an antidumping petition only among heavy users developing countries, thus qualifying the impressions that can be derived by the simple correlations shown in Figure 1. The results for tariff levels and tariff changes are consistent with a world where

¹⁷ Our definition of developed countries includes Japan and Norway, neither of which are not traditional users of antidumping.

antidumping petitions in heavy users are launched in order to preserve current levels of high protection. In contrast, developed countries, which have much lower tariff levels and larger percentage changes in tariff rates (see Table 7) do not seem to be characterized by this same phenomenon; trade liberalization and tariff levels are not helpful predictors of antidumping patterns among high income countries.

We turn now to a discussion of other possible explanations of antidumping petition activity. These other factors are used as control variables in order to be able to be as precise as possible in quantifying the effects of trade liberalization on antidumping. However, they also are of interest in their own right since their relevance has been discussed in the literature and here we offer an assessment over a large set of countries.

First of all, we see strong evidence that trading partners' use of antidumping may influence the incidence of antidumping in both developed and developing countries in Tables 3 and 4. Both subsamples show that retaliation variables help explain the probability of observing an antidumping petition. We see that the coefficient on bilateral retaliation within the same sector (RETALIATION_INIT) has the expected positive sign and is significantly different from zero at a one percent level in all specifications in both developed and developing countries. The same is true for the total number of antidumping measures actually imposed in the sector in the partner country (RETALIATION_MEAS) as well as the number of antidumping cases brought in all sectors in the partner country (RETALIATION_INIT_AGG).¹⁸ These results are consistent with the existing literature that shows that retaliation may play an important role in the antidumping motivations. These patterns for retaliation do not hold, however, for developing countries that have become heavy users of antidumping as shown in Table

¹⁸ The results are qualitatively identical if RETALIATION_MEAS_AGG is used instead.

5 where none of the coefficient estimates are significant.

Our earlier discussion also suggested that there should be a difference in the size of the marginal probability effects across these three regressors. In particular, we expected that measures actually imposed in a sector should have the largest effect (since they result in a greater trade impact) than simple initiations in the sector. We also expected that the country-wide initiations in the partner country should have less of an effect than either of sectoral effects since the industry considering filing a petition is less likely to care about antidumping activity in other sectors of the partner country. We do see some weak evidence in favor of these predictions. In fact, the estimate for the marginal effects for sectoral measures imposed (RETALIATION_MEAS) is the largest of all the retaliation regressors in both developed and developing countries (though only marginally so in some cases). In addition, the marginal probability effects for petitions initiated at the national level (RETALIATION_INIT_AGG) is smaller than either of the sectoral measures in both the developed and developing country samples, with only one exception. In other words, we see evidence that industries considering filing a petition are more likely to be concerned about whether partner country actions have directly affected their export possibilities in the same sector than about petitions filed at the country or sector level.

The estimation results also allow us to examine the impact of deflected trade in the motivations for filing a petition. The results are consistent with the existing literature---antidumping actions in third countries can increase the probability that an industry may file an antidumping petition against a partner. In particular, all coefficients for our measures of deflection at the *sectoral* level are positive (as expected) and significantly

different from zero at a one percent level. However, antidumping actions in all sectors across the world (DEFLECTION_INIT_AGG) do not have any affect on filing behavior.¹⁹ Once again, we interpret this to mean that an industry cares more about what is occurring in its own sector than antidumping actions at a global or aggregate level.

There is one notable difference for the retaliation and deflection variables across the developed and developing country samples. In particular, we see that the point estimates for marginal probability effects are much larger for all of these regressors in developing countries than their developed country counterparts. This is consistent with a world in which strategic considerations may be more important for new users of antidumping than for traditional users.

We now turn to the variables that control for recent trends in sectoral trade. Both IMPORT_GROWTH and IMPORT_SHARE have positive and significant coefficients at least at 5 percent level in all tables.²⁰ These results are consistent with a world in which industries are more likely to file a petition against partner countries with a large and growing share in the import market for the sector in question, a result which reflects the expected outcome that countries use antidumping in sectors under import pressure. The significance also reflects once again the importance of time-varying sectoral effects in the empirical analysis.

We see some similarities but also some differences across the developed and developing country samples when we consider the effects of macroeconomic regressors.

¹⁹ The same holds true for DEFLECTION_MEAS_AGG, which controls for the impact of trade diverted by antidumping measures in place in all countries.

²⁰ All the results presented exclude outliers for import growth (i.e., top 10 percent of available observations). This means deleting from the analysis any observation with import growth that exceeds 245 percent and 275 percent in one year for developed countries and developing countries, respectively. IMPORT_GROWTH would present the opposite sign if these observations were not deleted although the other results would not change. Note that excluding IMPORT_GROWTH would not qualitatively change any result.

Table 3 shows that a strong currency results in an increased probability of observing an antidumping petition in the developed world, which is consistent with earlier studies. However, no such pattern exists for developing countries, which may reflect a more prevalent use of fixed exchange rates among these countries (see Reinhart and Rogoff, 2002). Moreover, we see only weak evidence of a cyclical pattern to antidumping petitions in the developed world---the positive coefficient on GROWTH suggests that as economy-wide growth increases, there is an increased likelihood of a petition. However, the significance of this coefficient is not robust across specifications. There is no evidence of explanatory power for GROWTH in the developing country samples; only one specification out of nine in Tables 4 and 5 suggest that economic growth is important. This suggests that industries in developing countries are more focused on their own economic conditions than overall performance in the nation's economy when deciding to file an antidumping petition. It might also suggest that administrators in these countries are not responding to broad economic pressures with the imposition of antidumping duties. We also see that INFLATION has a positive and significantly (at 5 percent) coefficient in all specifications across all three tables. In contrast, the role of CURRENT_ACCOUNT is very different between developed and developing countries. It has a robust and consistently negative effect, as expected, in the developed world and a positive and significant coefficient for almost all specifications involving developing countries. In every specification in Tables 3, 4, and 5 (except one), richer nations (as proxied by GDP_PC) are more likely to file AD petitions.

IV.1 Sectoral industrial data

The results suggest that the time-varying sectoral effects are important predictors for the probability of observing an antidumping filing. We saw consistent patterns that sectoral considerations were more important than aggregates in the retaliation variables. We also saw that sectoral tariff levels and industry-level import variables were helpful in explaining filing patterns. We therefore turn now to a more detailed consideration of these effects by utilizing the newly-available data from the World Bank's Trade and Production database. In particular, we include one-year changes in the value of sectoral output and employment. As noted above, one of the problems of this approach is that it lowers the number of observations that can be used in the analysis. Nonetheless, the addition of these variables includes important time-varying information at the industry-country level.

Table 6 reports the marginal probability estimates for developed and heavy user developing countries using two different measures: the change in nominal output and the change in sectoral total employment. The other regressors are based on column (1) in Tables 3 and 5.

Surprisingly, the results show only weak explanatory power in these sectoral variables. For developing countries, we see that falling output is correlated with a higher probability of an antidumping petition. However, the coefficient estimate for changing employment is not significantly different from zero. The results for developed countries show no evidence that these measures of sectoral variation have any explanatory power. There are a number of explanations for these results. One possibility is that there are other factors more important but are not available, such as profitability. We do see

however that the sectoral effects of imports continue to help explain filing decisions. Another possibility is that industries are forward-looking; their output and employment have not yet changed but high levels and growth of imports suggest future pressures and therefore a higher probability of filing an antidumping petition.

We note that the patterns of signs and statistical significance for other control variables in Table 6 are quite similar to those of column (1) of Tables 3 and 5, with retaliation variables now significant for the heavy antidumping users among developing countries. Thus, the role of trade liberalization is unchanged despite the much smaller sample size when using the sectoral production data.

IV.2 Economic significance

The marginal effects presented so far do not shed much light on the economic significance of our results since the regressors are measured in different scales and they present different ranges of variation. Thus, in Table 7 we report percentage changes in the average probability of filing an antidumping case resulting from a one standard deviation change in each regressor while keeping all other determinants at their mean values. The table also reports the mean and standard deviation of each regressor to understand the order of magnitude of these changes. For each group of countries, we report the results for the specifications in the first two columns of Tables 3 through 5.

We focus first on our measure of trade liberalization, which is the main variable of interest. For those countries where TRADE_LIB is significant, it seems that trade liberalization can have a large impact on the probability of antidumping filings. In particular, columns (5) and (6) of Table 7 suggests that a one standard deviation increase

in tariff liberalization in developing countries that frequently use antidumping results in about a 32 percent increase in the probability of observing an initiation. Interestingly, we see that these “heavy users” of antidumping have liberalized much less than the entire sample of developing countries. This result reinforces the evidence in Moore and Zanardi (forthcoming) that antidumping does not seem to facilitate trade liberalization efforts.

The three groups of countries are relatively similar in terms of the economic significance of retaliation (when significant) and deflection; the estimated effects of these regressors are broadly comparable across columns. The results are also similar for `IMPORT_GROWTH` and `IMPORT_SHARE` while the results for the macro controls can be quite different but driven by countries’ specific experiences.²¹

It is interesting to note the similarities in the effects of various regressors and the fact that these countries are very much comparable in terms of import performance and their *passive* antidumping experience (i.e., retaliation and deflection). Thus, the different results for the substitution effects from tariffs to antidumping require other explanations. The long experience of developed countries with antidumping and the already low level of tariffs at the beginning of the sample may explain why trade liberalization is not a significant determinant of antidumping in the developed world. Among developing countries, though, it seems that learning is important. Industries in heavy users countries may have understood the relevance of the antidumping mechanism and how it can play at their advantage to limit the effect of trade liberalization as well as to limit the possibility of trade liberalization overall (as pointed out by Moore and Zanardi, forthcoming).

²¹ For example, the large effect of exchange rates in the first four columns of Table 7 is clearly driven by some huge changes occurring for some of the countries included in these samples.

Although the results found for these countries cannot be generalized to all new users, they suggest that the role of antidumping within each country can evolve dramatically.

V. Conclusions

This study contributes to a small but growing literature concerning the relationship between trade liberalization and the use of antidumping. We focus on one particular aspect of this dynamic, in particular whether recent changes in tariffs at the sectoral level play a role in industries filing antidumping petitions. The null hypothesis is that they do (i.e., industries may react to falling statutory protection by turning instead to the WTO-consistent antidumping measures). Panel B in Figure 1 showed that there is a simple correlation between the two; tariffs have fallen dramatically in recent decades among developing countries and the prevalence of antidumping actions has spread across the world to many countries.

Our results suggest some support for the proposition that industries are more likely to file antidumping petitions in sectors with declining applied tariffs but only for a specific subsample of developing countries. In particular, we only find such a positive correlation among developing countries that have become heavy users of antidumping in recent years. This statistical result is also economically significant since our estimates imply that a one standard deviation increase in tariff cuts would lead to a 32 percent increase in the probability of filing an antidumping petition for these countries. These results mirrors recent work by Bown and Tovar (2008) on the reforms undertaken by India in the 1990s. They conclude that the probability of initiating antidumping and safeguard proceeding is 50 percent higher as a result of a one standard deviation increase

in trade liberalization.

The empirical analysis, however, suggests that this substitution effect does not hold for other developing and developed countries. These contrasting results may be due to the fact that the other developing countries in our sample initiated much fewer antidumping petitions while developed countries already had very low tariff rates over the entire period covered in the analysis (i.e., the structural adjustment resulting from substantial trade liberalization had taken place in earlier years). These results are therefore different from those reported in Feinberg and Reynolds (2007), who analyze the relationship between bound tariffs and antidumping activity. They find similar results to ours for all developing countries in their sample but a statistically significant negative, and unexpected, correlation for developed countries. Our result suggests that this unexpected result for developed countries is not robust to changing specifications and different data.

On top of these novel conclusions, we also contribute to the empirical literature on the determinants of antidumping filings by analyzing how antidumping petitions are influenced by other countries' use of antidumping (i.e., retaliation and deflection), microeconomic conditions (i.e., at the sectoral level), and overall macroeconomic environment. By and large, our results are similar to the existing literature, with the exception for the lack of evidence on the effect of growth on initiations.

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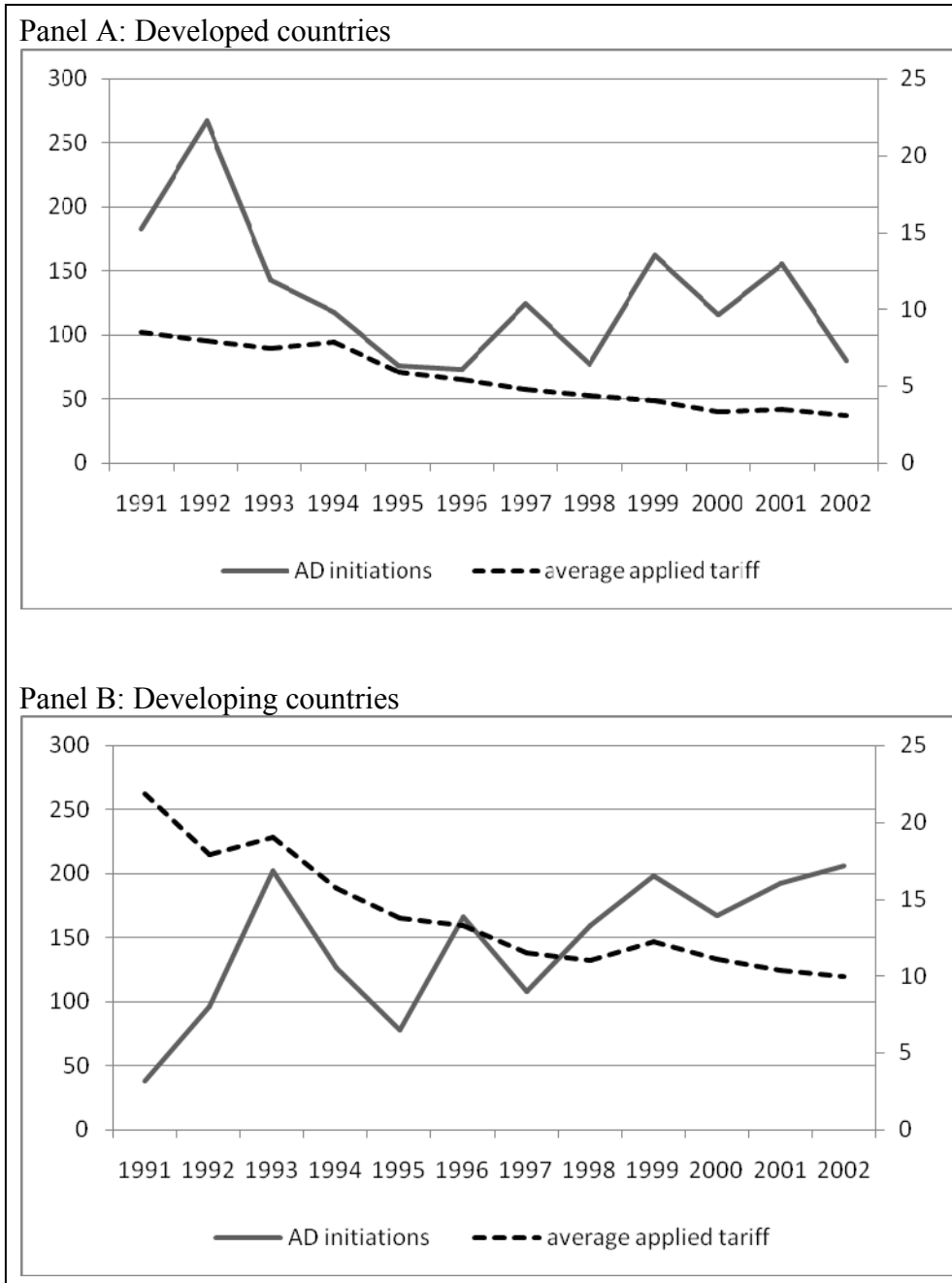
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Figure 1: Antidumping initiations and average applied tariffs



Notes: data based on countries included in empirical analysis (see Table 1 for details).

Table 1: Summary statistics

Country	Sample	AD initiations in sample	Observations with an AD petition	Initial tariff rate	Final tariff rate	Trade liberalization for entire sample
<i>Developing countries</i>						
Argentina*	1995-2002	149	1.40%	13.53	14.15	-4.65%
Bolivia	1996-2002	0	0.00%	9.90	9.60	3.03%
Brazil*	1992-2002	109	0.90%	46.28	15.49	66.52%
Chile	1995-2002	13	0.14%	10.96	8.00	27.02%
China	1997-2002	13	0.63%	40.58	18.07	55.48%
Colombia	1994-2002	27	0.23%	8.15	13.52	-65.78%
Costa Rica	2002	0	0.00%	7.96	6.61	16.97%
Ecuador	1996-2000	2	0.01%	10.96	15.09	-37.71%
Guatemala	1998-2002	0	0.00%	11.09	8.68	21.68%
Honduras	2002	0	0.00%	8.73	7.99	8.45%
Hungary	1994	0	0.00%	13.73	12.55	8.62%
India*	1993, 2000-02	160	2.62%	87.89	36.58	58.38%
Indonesia	1996-97, 2002	15	0.58%	21.50	11.41	46.93%
Jamaica	2002	0	0.00%	16.59	8.68	47.65%
Lithuania	1998	0	0.00%	4.34	4.36	-0.50%
Malaysia	1994	0	0.00%	17.33	15.07	13.03%
Mexico*	1998-2002	55	0.65%	14.42	20.37	-41.22%
Nicaragua	2001-2002	0	0.00%	6.58	5.72	13.08%
Paraguay	1997-2002	1	0.03%	9.88	13.76	-39.26%
Peru*	1996-2001	67	0.55%	18.70	13.48	27.92%
Philippines	1994-96, 2001-02	13	0.33%	21.74	8.18	62.37%
Poland	1998-2002	10	0.19%	10.48	19.24	-83.67%
South Africa*	1999-2002	47	0.79%	12.85	9.60	25.34%
Taiwan	2002	0	0.00%	9.04	7.98	11.67%
Thailand	1994-1996	3	0.10%	43.62	26.18	39.98%
Trinidad and Tobago	2002	0	0.00%	16.79	9.26	44.88%
Turkey	1996-2000	20	0.33%	10.22	9.98	2.31%
Uruguay	1998-2002	7	0.15%	12.49	15.06	-20.59%
Venezuela	1998-2002	7	0.13%	14.63	13.74	6.08%
Subsample total		718	0.50%	18.31	13.05	10.83%
<i>Developed countries</i>						
Australia	1994, 1999, 2000-02	96	1.21%	12.46	4.23	66.00%
Canada	1996-2002	83	0.68%	10.13	4.64	54.19%
EU	1991-2001	327	1.04%	8.76	5.49	37.30%
Japan	1991, 1996-02	5	0.04%	6.75	3.99	40.91%
New Zealand	1999-2002	15	0.33%	6.80	3.61	46.92%
Norway	1996-2002	0	0.00%	5.50	2.65	51.80%
United States	1992-2002	428	1.40%	5.51	3.37	38.88%
Subsample total		951	0.85%	7.99	5.71	48.00%

Notes: Summary statistics based on 115,138 observations for developing countries and 85,526 observations for developed countries. A * identifies heavy user developing countries. Initial (final) tariff rate refers to the country's average tariff rate in the first (last) year used in the calculation of TRADE_LIB2.

Table 2: List of variables

Variable	Expected sign	Description
TRADE_LIB2 (change 2 years)	+	The percentage change in sector k applied tariffs over two years
TRADE_LIB3 (change 3 years)	+	The percentage change in sector k applied tariffs over three years
TARIFF LEVEL	?	Unweighted average applied tariff rates for sector k
RETALIATION_INIT	+	Number of AD initiations launched in sector k against country i by country j
RETALIATION_MEAS	+	Number of antidumping measures imposed against country i by country j in sector k
RETALIATION_INIT_AGG	+	Number of AD initiations in <i>any</i> sector in country j
RETALIATION_MEAS_AGG	+	Number of AD measures in <i>any</i> sector in country j
DEFLECTION_INIT	+	Number of AD initiations world-wide (exclusive of the importing country) in all sectors
DEFLECTION_MEAS	+	Number of AD measures imposed world-wide (exclusive of the importing country) for sector k
DEFLECTION_INIT_AGG	+	Number of AD initiations in <i>any</i> sector in the all countries
DEFLECTION_MEAS_AGG	+	Number of AD measures in <i>any</i> sector in the all countries
IMPORT_GROWTH	+	Percentage change in sectoral imports from $t-1$ to t for sector k in country i
IMPORT_SHARE	+	Share of exports from country j to country i for sector k
OUTPUT CHANGE	-	Annual change in nominal output in sector k country i
EMPLOYMENT CHANGE	-	Annual change in total employment change in sector k country i
EXCHANGE_RATE	-	Annual average bilateral exchange rate between country i and country j (lower number means higher domestic value)
GROWTH	-	Annual average real GDP growth rate in country i
INFLATION	+	Average annual inflation rate in country i
CURRENT_ACCOUNT	-	Current account balance as a percentage of GDP in country i
GDP_PC	+	GDP per capita in country i

Notes: Country i refers to importing country, country j to exporting country, and k to 3-digit ISIC manufacturing sector.

Table 3: Results for developed countries (marginal probability effects)

	Expected sign	(1)	(2)	(3)	(4)	(5)
TRADE_LIB2 (change 2 years)	+	-0.00004 [0.00005]		-0.00003 [0.00004]	-0.00004 [0.00005]	0.00006 [0.00009]
TRADE_LIB3 (change 3 years)	+		0.000001 [0.000016]			
TARIFF LEVEL	?	0.0014 [0.0013]	0.0004 [0.0005]	0.0012 [0.0012]	0.0013 [0.0013]	0.0023 [0.0021]
RETALIATION_INIT	+	0.0002*** [0.0002]	0.0001*** [0.0001]			0.0003*** [0.0002]
RETALIATION_MEAS	+			0.0004*** [0.0003]		
RETALIATION_INIT_AGG	+				0.0001*** [0.0001]	
DEFLECTION_INIT	+	0.0001*** [0.0001]	0.00004*** [0.00004]			0.0002*** [0.0002]
DEFLECTION_MEAS	+			0.0002*** [0.0001]		
DEFLECTION_INIT_AGG	+				0.000001 [0.000001]	
IMPORT_GROWTH	+	0.0001*** [0.0001]	0.00003*** [0.00003]	0.0001*** [0.0001]	0.0001*** [0.0001]	0.0002*** [0.0001]
IMPORT_SHARE	+	0.0024*** [0.0018]	0.0031*** [0.0035]	0.0024*** [0.0018]	0.0027*** [0.0020]	0.0037*** [0.0023]
EXCHANGE_RATE	-	-0.00005*** [0.00002]	-0.00002*** [0.00002]	-0.00005*** [0.00002]	-0.00005*** [0.00002]	-0.00006*** [0.00002]
GROWTH	-	0.0038 [0.0039]	0.0007 [0.0010]	0.0035 [0.0037]	0.0037 [0.0038]	0.0071** [0.0062]
INFLATION	+	0.0062*** [0.0050]	0.0015*** [0.0018]	0.0055*** [0.0045]	0.0066*** [0.0051]	0.0296*** [0.0194]
CURRENT_ACCOUNT	-	-0.0070*** [0.0053]	-0.0020*** [0.0023]	-0.0063*** [0.0050]	-0.0068*** [0.0053]	-0.0032 [0.0027]
GDP_PC	+	1.11 x 10 ⁻⁶ *** [8.45 x 10 ⁻⁷]	2.03 x 10 ⁻⁷ *** [2.39 x 10 ⁻⁷]	9.24 x 10 ⁻⁷ *** [7.37 x 10 ⁻⁷]	8.30 x 10 ⁻⁷ ** [6.73 x 10 ⁻⁷]	3.44 x 10 ⁻⁶ *** [2.17 x 10 ⁻⁶]
Year and Industry fixed effects		Yes	Yes	Yes	Yes	Yes
Pseudo R-squared		0.28	0.28	0.27	0.25	0.28
Pseudo likelihood		3,049.77	2,793.53	3,072.27	3,151.73	2,988.77
Observed probability		0.0085	0.0087	0.0085	0.0085	0.0093
Predicted probability		0.0003	0.0001	0.0003	0.0003	0.0004
Observations		85,526	77,364	85,526	85,526	78,743

Notes: Robust standard errors in parenthesis; ** significant at 5%; *** significant at 1%; in column (5), only countries that initiated at least one antidumping initiations are included. The coefficients are the marginal probability effects, i.e. 0.0002 means that the probability of observing an antidumping petition increases by 0.02 percent.

Table 4: Results for developing countries (marginal probability effects)

	Expected sign	(1)	(2)	(3)	(4)	(5)
TRADE_LIB2 (change 2 years)	+	-0.0004 [0.0003]		-0.0004 [0.0003]	-0.0004 [0.0003]	0.0002 [0.0004]
TRADE_LIB3 (change 3 years)	+		-0.0001 [0.0002]			
TARIFF LEVEL	?	0.0081*** [0.0014]	0.0076*** [0.0013]	0.0083*** [0.0015]	0.0082*** [0.0015]	0.0073*** [0.0017]
RETALIATION_INIT	+	0.0010*** [0.0003]	0.0012*** [0.0004]			0.0012*** [0.0004]
RETALIATION_MEAS	+			0.0014*** [0.0005]		
RETALIATION_INIT_AGG	+				0.0003*** [0.0001]	
DEFLECTION_INIT	+	0.0005*** [0.0001]	0.0007*** [0.0001]			0.0006*** [0.0001]
DEFLECTION_MEAS	+			0.0007*** [0.0001]		
DEFLECTION_INIT_AGG	+				4.65 x 10 ⁻⁷ [3.91 x 10 ⁻⁶]	
IMPORT_GROWTH	+	0.0003*** [0.0001]	0.0003** [0.0001]	0.0003*** [0.0001]	0.0003*** [0.0001]	0.0004*** [0.0001]
IMPORT_SHARE	+	0.0098*** [0.0017]	0.0127*** [0.0017]	0.0104*** [0.0018]	0.0343*** [0.0103]	0.0125*** [0.0023]
EXCHANGE_RATE	-	-1.80 x 10 ⁻⁷ [8.72 x 10 ⁻⁸]	-2.06 x 10 ⁻⁷ [1.10 x 10 ⁻⁷]	-1.81 x 10 ⁻⁷ [9.21 x 10 ⁻⁸]	-1.90 x 10 ⁻⁷ [9.14 x 10 ⁻⁸]	-2.30 x 10 ⁻⁷ [1.08 x 10 ⁻⁷]
GROWTH	-	0.0017 [0.0034]	0.0062 [0.0041]	0.0013 [0.0035]	0.0002 [0.0033]	0.0066 [0.0047]
INFLATION	+	0.0001*** [0.00003]	0.0001*** [0.00005]	0.0001*** [0.00003]	0.0001*** [0.00003]	0.0001*** [0.00004]
CURRENT_ACCOUNT	-	0.0107*** [0.0023]	0.0150*** [0.0031]	0.0011*** [0.0023]	0.0103*** [0.0023]	0.0039 [0.0031]
GDP_PC	+	0.00002*** [4.40 x 10 ⁻⁶]	0.00001*** [3.07 x 10 ⁻⁶]	0.00002*** [4.51 x 10 ⁻⁶]	0.00002*** [4.45 x 10 ⁻⁶]	0.00002*** [6.63 x 10 ⁻⁶]
Year and Industry fixed effects		Yes	Yes	Yes	Yes	Yes
Pseudo R-squared		0.19	0.17	0.19	0.16	0.19
Pseudo likelihood		2,963.52	2,770.27	2,983.42	3,064.49	2,893.96
Observed probability		0.005	0.005	0.005	0.005	0.006
Predicted probability		0.001	0.002	0.001	0.001	0.002
Observations		115,138	101,019	115,138	115,138	98,899

Notes: Robust standard errors in parenthesis; ** significant at 5%; *** significant at 1%; in column (5), only countries that initiated at least one antidumping initiations are included. The coefficients are the marginal probability effects, i.e. 0.0002 means that the probability of observing an antidumping petition increases by 0.02 percent.

Table 5: Results for heavy user developing countries (marginal probability effects)

	Expected sign	(1)	(2)	(3)	(4)
TRADE_LIB2 (change 2 years)	+	0.0064*** [0.0019]		0.0064*** [0.0020]	0.0068*** [0.0020]
TRADE_LIB3 (change 3 years)	+		0.0057*** [0.0021]		
TARIFF LEVEL	?	0.0277*** [0.0048]	0.0565*** [0.0067]	0.0280*** [0.0048]	0.0286*** [0.0048]
RETALIATION_INIT	+	0.0025 [0.0014]	0.0025 [0.0018]		
RETALIATION_MEAS	+			0.0031 [0.0020]	
RETALIATION_INIT_AGG	+				0.0007 [0.0004]
DEFLECTION_INIT	+	0.0021*** [0.0002]	0.0025*** [0.0003]		
DEFLECTION_MEAS	+			0.0025*** [0.0003]	
DEFLECTION_INIT_AGG	+				0.00002 [0.00002]
IMPORT_GROWTH	+	0.0008** [0.0003]	0.0010** [0.0004]	0.0009*** [0.0003]	0.0010*** [0.0003]
IMPORT_SHARE	+	0.0324*** [0.0033]	0.0381*** [0.0036]	0.0347*** [0.0032]	0.0371*** [0.0035]
EXCHANGE_RATE	-	-0.00002 [0.00002]	-0.00002 [0.00003]	-0.00002 [0.00002]	-0.00003 [0.00003]
GROWTH	-	-0.0162 [0.0171]	-0.0641*** [0.0229]	-0.0196 [0.0174]	-0.0218 [0.0175]
INFLATION	+	0.0003** [0.0001]	0.0005*** [0.0002]	0.0003** [0.00001]	0.0003** [0.0001]
CURRENT_ACCOUNT	-	0.0106*** [0.0023]	0.1304*** [0.0274]	0.0955*** [0.0205]	0.0912*** [0.0204]
GDP_PC	+	0.00002** [0.00001]	0.00002 [0.00002]	0.00004** [0.00002]	0.00004** [0.00002]
Year and Industry fixed effects		Yes	Yes	Yes	Yes
Pseudo R-squared		0.19	0.19	0.18	0.16
Pseudo likelihood		1,943.05	1,699.67	1,974.11	2,030.70
Observed probability		0.011	0.012	0.011	0.011
Predicted probability		0.005	0.006	0.005	0.005
Observations		39,358	31,448	39,358	39,358

Notes: Robust standard errors in parenthesis; ** significant at 5%; *** significant at 1%. The coefficients are the marginal probability effects, i.e. 0.0002 means that the probability of observing an antidumping petition increases by 0.02 percent.

Table 6: Results with sectoral industrial data (marginal probability effects)

	Expected signs	DEVELOPED COUNTRIES		HEAVY USER DEVELOPING COUNTRIES	
		(1)	(2)	(3)	(4)
OUTPUT_CHANGE	-	-0.00003 [0.0002]		-0.0089** [0.004]	
EMPLOYMENT_CHANGE	-		-0.0003 [0.0003]		0.0053 [0.0049]
TRADE_LIB2 (change 2 years)	+	0.00004 [0.0005]	0.00003 [0.0004]	0.0132*** [0.0049]	0.0134*** [0.0032]
TARIFF LEVEL	?	0.0009 [0.0010]	0.0023*** [0.0021]	0.0756*** [0.0134]	0.0682*** [0.0083]
RETALIATION_INIT	+	0.0001 [0.0001]	0.0001 [0.0001]	0.0093** [0.0040]	0.0066** [0.0031]
DEFLECTION_INIT	+	0.0001*** [0.0001]	0.0001*** [0.0001]	0.0026*** [0.0005]	0.0023*** [0.0004]
IMPORT_GROWTH	+	0.0001*** [0.0001]	0.0001*** [0.0001]	0.0015*** [0.0006]	0.0011** [0.0005]
IMPORT_SHARE	+	0.0015*** [0.0014]	0.0018*** [0.0015]	0.0372*** [0.0052]	0.0360*** [0.0048]
EXCHANGE_RATE	-	-0.00002** [0.00001]	-0.00003*** [0.00002]	-0.00004 [0.00003]	-0.00003 [0.00003]
GROWTH	-	-0.0043** [0.0039]	0.0023 [0.0031]	-0.1410 [0.0094]	-0.2029*** [0.0627]
INFLATION	+	0.0056*** [0.0054]	0.0048*** [0.0046]	-0.0009** [0.00003]	-0.0001*** [0.00001]
CURRENT_ACCOUNT	-	-0.0082*** [0.0077]	-0.0053*** [0.0049]	-0.0151*** [0.0869]	-0.0569 [0.0069]
GDP_PC	+	2.32 x 10 ⁻⁷ *** [3.17 x 10 ⁻⁷]	1.26 x 10 ⁻⁶ *** [1.10 x 10 ⁻⁶⁷]	0.00007 [0.00005]	0.00005 [0.00003]
Year and Industry fixed effects		Yes	Yes	Yes	Yes
Pseudo R-squared		0.32	0.30	0.23	0.22
Pseudo likelihood		1,929.42	2,052.17	930.24	1,094.08
Observed probability		0.0084	0.0082	0.0155	0.0138
Predicted probability		0.0002	0.0002	0.0056	0.0052
Observations		58,701	61,760	15,128	19,293

Notes: Robust standard errors in parenthesis; ** significant at 5%; *** significant at 1%. The coefficients are the marginal probability effects, i.e. 0.0002 means that the probability of observing an antidumping petition increases by 0.02 percent.

Table 7: Economic significance (percentage change in probability)

	Expected signs	DEVELOPED COUNTRIES			DEVELOPING COUNTRIES			HEAVY USER DEVELOPING COUNTRIES		
		Mean (st. dev.)	(1)	(2)	Mean (st. dev.)	(3)	(4)	Mean (st. dev.)	(5)	(6)
TRADE_LIB2 (change 2 years)	+	0.13 (0.27)	-3.93 [3.55]	-3.43 [3.65]	0.04 (0.26)	-6.45 [4.85]	-6.17 [4.72]	0.01 (0.22)	32.72*** [11.37]	31.35*** [11.01]
TARIFF LEVEL	?	0.05 (0.04)	20.59 [12.95]	18.21 [12.96]	0.15 (0.11)	87.40*** [18.31]	86.41*** [18.01]	0.17 (0.20)	71.01*** [16.06]	69.00*** [15.60]
RETALIATION_INIT	+	0.004 (0.09)	7.94*** [2.66]		0.004 (0.09)	6.75*** [1.88]		0.005 (0.10)	5.00 [2.78]	
RETALIATION_MEAS	+	0.002 (0.06)		9.07*** [2.72]	0.002 (0.06)		5.77*** [1.68]	0.003 (0.06)		3.92 [2.56]
DEFLECTION_INIT	+	0.13 (0.68)	42.20*** [4.75]		0.23 (0.94)	39.07*** [2.92]		0.21 (0.88)	44.66*** [4.04]	
DEFLECTION_MEAS	+	0.07 (0.46)		34.92*** [4.75]	0.13 (0.60)		31.53*** [2.80]	0.12 (0.58)		32.55*** [3.91]
IMPORT_GROWTH	+	0.05 (0.56)	32.97*** [5.59]	35.46*** [5.72]	0.13 (0.72)	16.36*** [5.16]	16.76*** [5.09]	0.13 (0.72)	12.63** [5.54]	14.18*** [5.47]
IMPORT_SHARE	+	0.01 (0.05)	48.52*** [5.42]	51.66*** [5.62]	0.02 (0.06)	57.27*** [18.30]	59.25*** [3.96]	0.02 (0.06)	50.06*** [3.93]	52.17*** [3.95]
EXCHANGE_RATE	-	13.54 (428.37)	-100.00*** [.]	-100.00*** [.]	2,074.51 (24,376.85)	-97.26*** [6.76]	-96.94*** [7.67]	4.74 (61.34)	-19.78 [21.83]	-23.11 [22.36]
GROWTH	-	0.03 (0.01)	18.22 [10.16]	17.96 [10.12]	0.04 (0.03)	3.58 [6.83]	2.62 [6.74]	0.03 (0.02)	-7.39 [7.59]	-8.64 [7.38]
INFLATION	+	0.02 (0.02)	43.72*** [14.61]	41.11*** [13.94]	0.69 (2.65)	20.01*** [6.30]	20.26*** [6.37]	1.63 (4.30)	-23.49*** [8.23]	-22.42*** [8.37]
CURRENT_ACCOUNT	-	-0.002 (0.03)	-51.85*** [4.86]	-50.49*** [4.93]	-0.02 (0.03)	30.54*** [6.57]	30.17*** [6.51]	-0.03 (0.02)	44.32*** [11.36]	42.87*** [11.12]
GDP_PC	+	270.80 (68.28)	30.39*** [10.39]	26.94*** [10.07]	34.74 (23.11)	33.58*** [6.93]	33.11*** [6.79]	43.45 (24.57)	22.77** [9.91]	22.11** [9.72]

Notes: The table reports the percentage change in the predicted probability of initiating an AD petition when each regressor is increased by one standard deviation and all other regressors are kept at their mean; robust standard errors in square brackets calculated using the delta method; ** significant at 5%; *** significant at 1%.