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Does Antidumping Use Contribute to Trade Liberalization? An Empirical Analysis*

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Abstract

Some supporters of antidumping have argued that this procedure serves as a kind of "safety valve" for protectionist pressure. This paper examines whether there is any empirical evidence that the use of antidumping actions has contributed to tariff reductions in a sample of 35 developing and developed countries. There is very little evidence that such a relationship might exist among the 27 developing countries in the sample. We do find some weak but inconsistent evidence for antidumping helping liberalization efforts in the experience of developed countries, which have been the traditional users of antidumping.

Keywords: Antidumping, Trade Liberalization, Commercial Policy
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Introduction

Provisions for antidumping duties have long been a part of the multilateral trading system. Economists, by and large, have argued that these rules are distortionary practices that cause more economic harm than good. Mankiw and Swagel (2005), for example, argue that United States economic welfare would benefit from a unilateral repeal of the antidumping laws. Proponents of the antidumping system such as Mastel (1998) argue that antidumping import restrictions are necessary to combat "unfair" trade by which foreign firms sell below "normal" value and cause economic harm to domestic industries.

Other analysts such as Destler (1996) have pointed to another potential benefit of antidumping. They argue that broad trade liberalization efforts have been enhanced by the presence and use of antidumping procedures. These observers argue that antidumping rules are a useful "safety valve" by which protectionist pressure can be reduced on a narrow range of products even as governments reduce trade barriers across the economy as a whole. If such a relationship could be demonstrated, then economists' almost universally critical views of antidumping may need to be adjusted to account for one possible "upside" to the use of antidumping.

This study represents the first attempt to evaluate empirically this safety valve argument for antidumping. We use a new antidumping data set developed by the authors based primarily on individual governments' antidumping publications and on Bown's (2005) data set[1] to assess whether the number of antidumping initiations or the final imposition of antidumping duties have contributed to trade liberalization in a sample of 35

[1] Many earlier studies of global antidumping use have relied on statistics compiled by the World Trade Organization. Unfortunately, the government submissions on which these statistics are based are frequently incomplete or inaccurate.

developed and developing countries for the 1988 to 2004 period. We examine both initiations and imposed measures to help ascertain whether there are any differential effects of industry requests for duties (as proxied by initiations) or antidumping restrictions finally imposed. We also control for macroeconomic conditions as well as for industry and country unobservables.

Trade liberalization in this paper is defined as the percentage change in applied tariffs for each country at the three-digit ISIC level. "Applied" tariffs are those in place and actually affecting trade flows, rather than those agreed upon at multilateral trade negotiations (i.e., "bound" rate). Changes in applied tariffs represent the clearest and most easily interpreted modifications in trade policy in a given country.[2]

We find that there is some evidence that past antidumping actions are correlated with later reductions in tariff barriers. There is, however, a strong divergence in experience between developed and developing countries in this regard. While there is some evidence that the antidumping system is correlated with trade liberalization in developed countries, developing countries experience does not suggest such a relationship exists.

This paper also contributes to the (very short) empirical literature on trade liberalization. The few existing studies focus on specific countries experiences or use a case study approach. Instead, our paper makes use of an extended sample of countries over a relatively long time horizon to try to reach general conclusions, although allowing for differences between developed and developing countries.

The remainder of the paper is divided into the following sections. Section I discusses the relevant literature. Section II includes some descriptive statistics about tariff

[2] The paper does not address other ways in which countries can liberalize such as changes in non-tariff barriers.

reductions and antidumping use in the countries included in this study. Section III lays out the econometric strategy along with a discussion of relevant variables for the study. We discuss the empirical results in section IV for both the entire sample as well as separate discussion for developed and developing country experience. Section V concludes with an interpretation of the results.

I. Literature Review

The economics literature on antidumping encompasses a broad range of theoretical, empirical, and public policy analyses, all of which cannot be reviewed here.[3] There are major themes, however, present in the literature that are relevant to the present study.

The first involves the spread of antidumping use to a host of new countries during the last twenty years. Miranda et al. (1997) were the first to document the broad set of new antidumping users. Prior to 1985, almost all antidumping investigations occurred in Australia, Canada, the European Union, New Zealand, and the United States. Miranda et al. argue that the introduction of antidumping may have helped liberalization efforts in some countries by requiring governments to adhere to a rules-based import relief system rather than more arbitrary methods. Prusa (2001) provides a more formal econometric analysis of the implications of the spread of antidumping to new users. He finds that the use of antidumping has lead to large decreases in imports of affected products. Zanardi (forthcoming) has provided further evidence for a more recent time period about how antidumping use has spread across the globe.

Another strand of the literature looks at the impact of antidumping on the domestic

[3] See Blonigen and Prusa (2003a) for a broad survey of the literature.

economy. Gallaway et al. (1998), for example, estimate that U.S. antidumping duties have reduced economic welfare in the U.S. by US$ 4 billion a year. Vandenbussche and Zanardi (2006) provide recent evidence on how the antidumping system has reduced aggregate trade among traditional and new users. In particular, they find that imports into traditional users are depressed because of the reputation that these users have built over time and because of current antidumping actions. While a reputation effect does not seem to have emerged yet for new users, their antidumping actions have significant trade depressing effects leading to a reduction of their annual imports, on average, of around 6.7%.

Recent work has focused on how the use of antidumping by one country can affect retaliation by another. The argument is that the presence of antidumping may have provided an incentive for retaliatory restrictions by targeted countries. Feinberg and Reynolds (forthcoming) and Prusa and Skeath (2002, 2004) find evidence that retaliation is a major determinant in explaining the recent explosion of antidumping cases. For the United States, Blonigen and Bown (2003) find that firms' decision to file a case against a particular country depends on that country's power to possibly retaliate through the GATT/WTO dispute settlement mechanism. More worrying is evidence that even the U.S. antidumping authority takes into account a country's retaliatory power in its decisions.

The "safety valve" argument views antidumping more sympathetically, primarily because it might represent the lesser of two evils. Destler (1996) for example notes that the existence of AD laws in the U.S. may provide important "cover" for politicians who might otherwise succumb to protectionist pressures. Moore and Suranovic (1992, 1994) argue that making antidumping procedures less accessible may push protection-seeking industries into more distortionary types of lobbying. Finger and Nogués (2005) provide at least some

anecdotal evidence for the safety valve argument for antidumping. In interviews and case studies of Latin American officials, they find that broad trade liberalization was advanced by carefully managing antidumping (and safeguard) procedures. Feinberg and Reynolds (2005) look at a slightly different but related issue. They investigate whether there is any evidence that trade liberalization leads to more use of antidumping as domestic firms react to the resulting increased competition – and it seems that antidumping use increased for those countries engaging in larger tariff concessions at the Uruguay Round.

There is clear evidence that at least U.S. policy-makers find the safety valve argument compelling, at least for public statements. For example, in a May 2001 letter to the U.S. President, Senator Max Baucus, the leading Democrat for trade policy issues noted that "trade laws provide American workers and industries the guarantee that, if the United States pursues trade liberalization, it will also protect them against unfair foreign trade practices" (Baucus, 2001).

Another important strand of the economics literature relevant for this study is the determinants of trade liberalization. While there is a vast literature on factors that affect the provision of protection, there is remarkably little work on empirical studies of what factors help explain trade liberalization in various countries. Work on the political economy of protection typically focuses on what factors help explain successful lobbying for protection (e.g., Helpman and Grossman (1994) and Goldberg and Maggi (1999)) or the determinants of specific protectionist trade outcomes (e.g., Moore (1992), Hansen and Prusa (1997), Baldwin (1985)). But the current study is focusing, not on what factors are important in raising new import restrictions but instead what explains trade liberalization.

As for the few studies trying to explain trade liberalization, Liu (2002) considers the

determinants of Taiwan's trade liberalization efforts from 1986 through 1995. The author finds among other things that traditionally protected sectors were subject to slower liberalization. The advantage of a case study approach is the availability of many country-specific data, against the backdrop of lack of generality. Ancharaz (2003) examines the factors that help explain trade policy reform in sub-Saharan Africa. The author looks at, among other factors, macroeconomic variables like the current account, real GDP growth, and inflation and how they help explain trade reforms. La Ferrara (1996) investigates the decision to conduct trade reforms but not their intensity and finds evidence that economic crises and support from multilateral agencies are important determinants for a sample of sub-Saharan countries.

II. Descriptive Statistics

This study will examine the relationship between trade liberalization and the use of antidumping in 35 countries for the period 1988-2004. Table 1 provides some basic information about the countries in the data set. These particular countries were chosen because there is available data on sectoral tariff rates for the relevant period from the World Bank, which will form the basis of the dependent variable for the empirical work.[4]

In this paper, trade liberalization is defined as the percentage change in tariffs at the three-digit ISIC level (revision 2). The percentage change is calculated from a base year and five years into the future. We believe that five years is a time frame which would allow for most tariff changes to be phased in following a change in trade policy. For a

[4] Our empirical specifications will always include country fixed effects. For this reason, only countries with enough annual observations to construct at least two observations for trade liberalization can be included in the analysis. Such constraint explains why countries like South Korea and Taiwan are not part of the dataset.

particular country, these variables are included only for non-overlapping periods.[5] Specifically:

$$\Delta t_{k,i,t} = -\left[\frac{t_{k,i,t} - t_{k,i,t-5}}{t_{k,i,t-5}}\right] x\, 100 \qquad (1)$$

where $t_{k,i,t}$ is the simple average of applied tariff rates in country *k*, sector *i* and year *t*. Thus, we define a reduction in tariffs in a sector as a positive number. From Table 1, we see that this was a period of substantial tariff reductions for these nations; the average (applied) unweighted tariff rate fell from 20 percent to just over 10 percent.[6] Similar patterns arise when the countries are broken up into developed and developing countries categories. Column 1 shows that, not surprisingly, the average tariffs for developing countries in the first year of the sample are much higher (24.3 percent) than their higher income counterparts (7.1 percent). Column 2 shows the analog for the final year in the database for each country. Developed countries in the dataset reduced their applied tariffs to just over 3 percent, which represents a reduction of 56 percent compared to an average change in tariffs of approximately 47 percent for developing countries.[7]

Column 3 of Table 1 includes the total number of antidumping investigations launched in each country for the entire period. We see that the U.S. is the most frequent user in the data set as whole with 559 investigations. Among the developing countries, India has been the most frequent user of antidumping in the sample. At this point, it is important to note that import-competing firms or their workers typically request the institution of an antidumping investigation (though governments can sometimes refuse to

[5] For example, if tariff data is available for 1990 through 2001, one observation would be for the 1990-1995 period and the second would be for 1995-2000.
[6] Note that the information in Table 1 does not include any agricultural or processed food categories.
[7] The averages across countries are not strictly comparable since they involve different time periods.

begin the process). Thus, the number of initiations is a measure of the access that domestic industries have to the antidumping process. Column 4 of Table 1 displays the number of antidumping restrictions that were imposed.

A measure of domestic firms' success in the antidumping process can be roughly approximated as the ratio of measures to investigations. From the last column in Table 1 we see that about one half of antidumping investigations result in duties. Developing and developed countries as a group reflect the same pattern. We see that India reduced its average tariffs by 52 percent (from 58.3 to 28.1 percent) while approving just over 66 percent of antidumping petitions. Malaysia also approved a higher than average percentage of antidumping petitions (64.7 percent) while dropping average tariffs by 34 percent. These suggest at least the possibility that antidumping might have had some role to play in tariff reduction. However, some of the countries that liberalized the most, including Indonesia (average tariff reduction of 71 percent), China (70 percent), and Brazil (68 percent) had relatively small numbers of imposed duties as a percentage of initiated cases (40.5 percent, 25.8 percent, and 45.2 percent, respectively).

At a sector level, Table 2 reports average trade liberalization and antidumping initiations and measures for the 29 industrial sectors included in the analysis. On average, sectors liberalized by 10.9%. However, there are huge differences across sectors: beverage and tobacco registered an increase in trade protection of about 23.1% and 20.1%, respectively. The other two agricultural sectors (i.e., sectors 311 and 312) are also among the categories with the lowest tariff reductions. This is hardly a surprise and we will check the robustness of our results to the exclusion of these four sectors. As for antidumping, the steel and chemical sectors confirm their reputation of heavy filers accounting for 27.3%

and 26.7%, respectively, of total initiations (and very similar shares of measures). The textile sector is a distant third with single digit rates of initiations and measures.

III. Econometric Approach and Data Description

We imagine that there are a number of factors that determine the degree to which tariffs are reduced in any particular country and industry. On the one hand, initial macroeconomic conditions can constrain or enhance the ability of a government to undertake any policy reform, including changes in import restrictions. The level of economic development may be correlated with a safety net for those who might bear adjustment costs associated with trade reform. The economics literature has also focused on the political clout of particular industries in withstanding trade liberalization efforts. In this particular study, we want to assess whether access to antidumping can act as a safety valve for protectionist pressure that could help smooth the path to more liberalization.

We do not develop a formal theoretical model for the analysis. Instead, we estimate a reduced form equation that will allow for various types of influences on the degree of tariff reduction. Specifically, we assume that the percentage change in tariffs for industry sector *i* in country *k* in period *t* ($\Delta t_{k,i,t}$) can be written as:

$$\Delta t_{k,i,,t} = \delta AD_{k,i,t-5} + \alpha X_{k,t-5} + \beta Z_{i,t-5} + \varepsilon_{k,i,t} \qquad (2)$$

where $AD_{k,i,t-5}$ is a measure of antidumping activities five years previously (t-5) and $X_{k,t-5}$ and $Z_{i,t-5}$ are matrices of country and industry variables, respectively in that same earlier period. The values δ, α and β are vectors of weights (to be estimated) on these explanatory variables. Note that we use lagged explanatory variables to avoid endogeneity

problems; their values will be known in the base year used to calculate the tariff reduction. For example, tariff reductions (contemporary and past) may affect contemporary and future macroeconomic conditions but future tariff reductions will not affect past economic conditions. A disturbance term is also included ($\varepsilon_{k,i,t}$). We will make various assumptions about this in the analysis to account for different types of fixed effects.

We have developed alternative versions of two separate measures of antidumping activity. The first is the total number of antidumping investigations initiated (AD_INIT) in the base year used to calculate the tariff change for the particular country. We interpret a positive coefficient as evidence that industries are more likely to accept trade liberalization in the subsequent five years if there has been easy access to an antidumping process. A second version considers the total number of antidumping measures (i.e., duties and minimum price arrangements) imposed in that same year (AD_MEAS).[8] A large number for this variable means that agents in the economy can see that the antidumping process actually results in import restrictions. In addition to the annual total for initiations and measures, we include second versions that total the number of initiations and measures for the base year and the two years prior (AD_INIT_3 and AD_MEAS_3). These are meant to capture the country's longer term experience in antidumping. We also include a five year version of these variables (AD_INIT_5 and AD_MEAS_5) for sensitivity checks in some of the specifications.

Two alternative versions of these antidumping control variables are created. In section IV.A., we use total antidumping at the country level (COUNTRY_AD_INIT,

[8] Note that in many jurisdictions antidumping investigations might take as much as a year to complete so that the number of cases initiated and the number imposed in one year do not necessarily correspond even if all initiations were to result in antidumping measures.

COUNTRY_AD_MEAS, COUNTRY_AD_INIT_3 and COUNTRY_AD_MEAS_3). These versions will control for the effects of country-wide use of antidumping. For example, an industry facing calls for trade liberalization that has not yet used antidumping might be affected by other industries' experience in the country. The other version, included in section IV.B., calculates analogous variables for the specific industry (SECTOR_AD_INIT, SECTOR_AD_MEAS, SECTOR_AD_INIT_3 and SECTOR_AD_MEAS_3). This will control for the particular sector's experience with antidumping.

The candidates for $X_{k,t-5}$ include variables that describe the macroeconomic conditions in the "base period" (t-5) that do not vary across industrial sectors. The sources for these and other variables are included in Table 3. In this regard, some of our regressors are the same as in Ancharaz (2003) although our empirical analysis is different in nature. He focuses on Sub-Saharan Africa to test whether economic crises enhance the extent of trade reforms. In contrast, our sample is only determined by data availability and its wider coverage encompasses a range of countries and economic experiences. Correspondingly, we will see that some of our results mirror his findings while others do not.

The first macroeconomic regressor is real gross domestic product per capita (GDP/CAP), which will control for the level of economic development in a country.[9] A positive value on this slope coefficient would suggest that the political pressures to resist trade liberalization would fall as average income increased. This might be as a result of a more efficient set of policies that provide a social safety net so that those facing trade adjustment costs would be less likely to fight tariff reductions. A negative value might

[9] Nominal GDP has been deflated using the GDP deflator.

indicate that poorer countries are more likely to adopt trade liberalization as a means to eliminate economic inefficiency associated with protectionism.

The next macroeconomic variable is the average inflation rate in the base period and in the two previous years defined as the percentage change in the GDP deflator (INFLATION) or in the consumer prices when the GDP deflator is not available. We do not have *a priori* expectations for this variable. One might imagine that countries might use trade liberalization to fight inflation by increasing economic efficiency and lowering import prices. Thus, higher inflation in the base period might be correlated with more trade liberalization, so that the coefficient on INFLATION would be positive. One might also expect a positive coefficient for developing countries if IMF programs required trade liberalization. A negative coefficient might suggest that policy makers in countries facing stable macroeconomic conditions (at least as proxied by price changes) might feel confident about reducing trade restrictions.

Another macroeconomic variable is the average of the annual percentage growth in per capita real GDP for the base period and the two previous years (GROWTH). A positive coefficient might suggest that countries facing recent strong economic performance would be willing to reduce trade barriers in the coming years. A negative value could indicate that policy-makers facing poor economic growth might try to use trade liberalization as an impetus to better economic performance.

Finally, we also include the average current account as a percentage of GDP (CA/GDP) for the base period and the two previous years.[10] Once again, the expected sign

[10] Other macro variables could be included. For example, Knetter and Prusa (2003) have shown that antidumping initiations are influenced by changes in the exchange rate, However, the possible effect of the exchange rate on trade liberalization is less obvious. We tried including measures of nominal and real exchange rates and the qualitative and quantitative results presented in the next section are unaffected while

for this variable is ambiguous. On the one hand, trade politics and mercantilist tendencies normally mean that leaders will find tariff reductions easier when a country has a large current account (adjusted for the size of the economy). However, countries facing large current account deficits are large borrowers on international financial markets. In some instances, especially in the developing world, this may lead to IMF programs that might involve trade policy reform. Thus, one might be more likely to see a negative coefficient for developing countries.

Trade liberalization is also potentially profoundly affected by important industry level effects within each country. Such effects might include trade orientation (net importing or exporting sector), employment and wage effects, value-added, profit conditions, and associated lobbying and political strength. Unfortunately, while there are some of these series available for the particular countries from World Bank and other sources, there are many missing data. We have therefore made a decision to control for these unobservable influences in some specifications of the model through combined industry and country fixed effects.

It will also be important to control for the initial levels of tariffs in the country. We develop two alternative measures. The first will allow us to control for more of the sectoral level variation in trade policy. This variable, called SECTOR_TARIFF, is the average sector nominal tariff for the base year for each observation. The second alternative is the simple average country-wide nominal tariff (COUNTRY_TARIFF) and therefore does not vary across sectors. We also include the square of each of these variables to allow for non-linearities. A positive value on SECTOR_TARIFF would suggest that sectors with high barriers are more likely to see the greatest reductions. A negative value would mean that

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the exchange rate is significant only in some specifications.

those same sectors can systematically withstand pressures for liberalization. The interpretation for a positive coefficient COUNTRY_TARIFF is slightly different: this might suggest that countries with higher overall tariffs are more likely to liberalize more.

It is possible that the reaction of policy makers in developed and developing countries might different systematically for the explanatory variables. Developing countries, many of which have faced much more troubled economic times in recent years than developed countries, might have different reasons for trade liberalization. Similarly, developing countries are relatively new users of antidumping procedures so that their relation to trade liberalization might differ from developed countries, especially those that have used antidumping for many years. Consequently, we will divide the sample into developed and developing country samples in the econometric work below.

The list of regressors does not control for GATT/WTO membership and existence of antidumping laws for a particular country. The reason is that there is little variation in such dummies for the countries and years in our dataset. In fact, countries belonging to the GATT/WTO account for 85% (91%) of the base (final) year observations. Similarly, 73% (84%) of the base (final) year observations relate to countries with antidumping laws. For these reasons, we decide not to include such dummy variables that would basically act as simple mean shifters in combination with country (or country/industry) fixed effects.

IV. Regression Results

We discuss regression results in two separate sections. The first includes all 35 countries in the database and the second will split the sample into developed (8 nations[11]) and

[11] The European Union will be treated as one "country" since members follow a common trade policy.

developing (27 nations) country samples. Each section includes results with industry-, country-, and country/industry fixed effects. In all regressions, the dependent variable is the percentage change in the tariff levels for each of the 29 three-digit ISIC categories. For all the specifications we report robust standard errors.

IV.A. Outcomes with Country and Industry Specific Effects

In Table 4, we display the regression output for the combined sample which includes 2261 total observations for 35 nations. Table 4 includes the results when there are no combined country/industry fixed effects though we do allow for separate industry and country dummy variables. Various controls for macroeconomic conditions in the countries are included. The first two columns explore explanations for trade liberalization in the absence of any impact from the use of antidumping. The remaining columns include those potential effects.

In column 1, we control only for country fixed effects in the regression as well as the macroeconomic variables.[12] In this specification, all macroeconomic controls are significantly different from zero except GROWTH. We see evidence that nations with higher initial tariffs tend to liberalize more (since TARIFF is positive) but that this relationship falls with higher-and-higher tariff levels (TARIFF-SQUARED is negative). This suggests that countries with very high average tariff levels may be reluctant to liberalize. The result for lagged per capita income (GDP/CAP) suggests that countries starting at higher levels of economic development tend to liberalize more. The result for INFLATION is evidence that countries facing economic stress through high inflation are

[12] The parameter estimates for all fixed effects in this study are suppressed for reasons of space but are available upon request.

reluctant to reduce trade barriers.[13] This may be somewhat surprising since trade liberalization could be seen as a way to fight higher prices through improved economic efficiency and lower import prices. Indeed, Ancharaz (2003) finds evidence that higher inflation leads to trade liberalization in Sub-Saharan Africa, but this is never the case in our various specifications. We also see that countries with current account surpluses are more likely to liberalize than those with deficit (CA/GDP has a positive and significant coefficient). There is however little evidence in this specification that economic growth is positively correlated with trade liberalization. These last two results matching Ancharaz (2003) findings.

Column 2 of Table 4 repeats the exercise of the first column but includes both country and industry fixed effects. The results are essentially identical. A formal test that the country fixed effects are jointly zero yields an F-statistic of 34.2 and a marginal significance less than 0.01 percent. Not surprisingly, there seem to be unobserved country conditions that help explain the pattern of trade liberalization. In contrast, there is strong evidence that all industry specific effects are jointly zero (with a marginal significance of 28 percent). This latter result might be surprising at first blush since it suggests that unobservables at the industry level are not important. But it is important to remember that these are common industry effects across countries; we will come back to specifications that consider country/industry fixed effects in later specifications.

We now turn to the key questions in this research –the possible role of antidumping in the liberalization process. As noted above, two different versions are used, one of which is antidumping initiations and the second is measures finally imposed. Recall that typically

[13] In regressions not reported here, we included INFLATION squared but found little evidence of a non-linear effect similar to TARIFF-SQUARED.

domestic firms rather than governments initiate antidumping petitions so that this number reflects requests from import-competing firms for protection. The final imposition of antidumping measures reflects instead the decisions of governments to grant protection. These two measures will therefore let us explore whether it is industry *access* to an antidumping process or *actual protection* under the system that might be important to tariff reduction.

As we discussed above, four particular antidumping specifications are employed. COUNTRY_AD_INIT is the total number of investigations initiation in the particular country in the base year for trade liberalization. This controls for the contemporaneous antidumping policy environment. The second specification (COUNTRY_AD_INIT_3) is the total number of initiations of antidumping investigations during the base year plus the two previous years and would take into account recent antidumping experience, not just a single year. The third version (COUNTRY_AD_MEAS) is the analog to COUNTRY_AD_INIT but is the total number of antidumping measures that are actually imposed in the base year. The fourth version (COUNTRY_AD_MEAS_3) is the total number of antidumping duty orders put in place by the country in the base year and the two earlier years.

Columns 3 and 4 of Table 4 include the results of the two specifications (with industry and country fixed effects included) for the contemporaneous data. In column 3, we see little evidence that COUNTRY_AD_INIT helps explain trade liberalization, though it does have a positive sign. In contrast, the coefficient on the total number of antidumping measures in the base year (COUNTRY_AD_MEAS) is significantly different from zero at a one percent significance level. These two results suggest that it might be more important

that antidumping measures are actually put in place rather than just having firms able to petition the government for import relief. The coefficient estimate for COUNTRY_AD_MEAS is surprisingly large: one more antidumping order imposed may lead to as much as a 1.3 percentage point increase in average tariff reduction.

Columns 5 and 6 of Table 4 display the regression output when the total number of initiations and measures for three years is included. We see that the total number of antidumping investigations initiated is positively correlated with sectoral trade liberalization; the coefficient estimate for AD_INIT_3 is statistically different from zero at a one percent level with a t-statistic of 6.96. These results carry through in column 6 when we include AD_MEAS_3. Thus, there are at least some indications that the antidumping process has contributed to the reduction of tariffs in the sample period. If these results hold up in other specifications, they might suggest a possible important past role for antidumping in trade liberalization in the sample countries.

We also investigate whether the experience of developed and developing countries might be different. This seems plausible for three reasons. First, the coefficient on GDP/CAP suggests that trade liberalization varies across average incomes. Furthermore, developed countries have a longer history of trade liberalization and start the sample period with much lower tariffs. Finally most developed countries in the sample have a much longer and more extensive experience with antidumping.

Tables 5 and 6 repeat the output of columns 2-6 of Table 4 but break up the sample based on the level of economic development. The countries included in each sample are indicated in Table 1.

Table 5 shows the results for the 8 developed countries and involves 582

observations. The results for the macroeconomic variables for developed countries are broadly consistent with the results for the entire sample. For example, with the exception of one specification, TARIFF and TARIFF-SQUARED remain significant at a one percent level with positive and negative coefficients, respectively. We also see that a higher base period per-capita GDP is associated with greater trade liberalization so that even among developed countries, higher income countries are more likely to embrace openness. And once again, developed countries with higher current account surpluses as a percentage of GDP are more likely to accept lower import restrictions. However, the coefficient for INFLATION is sometimes positive (but never significant) and sometimes negative (and significant) for the developed country results in Table 5. It is therefore difficult to assign a common interpretation for the impact of this variable. This result mainly reflects the relatively low level of variance for this variable among developed countries. In addition, while the coefficient on GROWTH was generally not significant for the whole sample, it is positive with a marginal significance below one percent in all specifications for developed countries. These two results taken together may indicate that developed country policy makers pay more attention to economic growth than inflation when setting trade policy.

We turn now to the correlation of antidumping with tariff reduction for developed countries. It is clear from the results that the developed country experience mirrors that of the entire sample –use of antidumping is correlated with more trade liberalization. We see in columns 2 and 3 that contemporaneous antidumping initiations and imposed measures are both significantly different from zero at less than a one percent level. Similarly, COUNTRY_AD_INIT_3 and COUNTRY_AD_MEAS_3 are both highly significant in the regressions reported in columns 4 and 5 of Table 5. The combination of these results

suggests that developed countries' experience with antidumping may have indeed helped trade liberalization efforts as antidumping proponents have long contended. Finally, it is worth noting the relative sizes of the coefficient estimates on the antidumping variables. In particular, the coefficients for both versions of antidumping initiations are much smaller than those for antidumping measures actually imposed. This is consistent with the interpretation that access to an antidumping system is less important to trade liberalization than imposing final antidumping duties; both may be important to a credible operation of a "safety valve" but actually limiting imports seem to be much more important, at least in developed countries.

In Table 6, we report the results for the subgroup of 27 developing countries. We see that developing and developed country trade liberalization experience is similar for a number of explanatory variables. For example, the results for TARIFF and TARIF_SQUARED mimic those of the earlier complete and developed country samples: sectors with higher tariffs liberalize more but this result falls off for very high initial tariffs. We also see that GDP/CAP and the current account as a percentage of GDP (CA/GDP) enter positively (and significantly different from zero) for developing countries as well. These results suggest common experience among developed and developing countries for a number of different factors –high incomes, current account surpluses, and high initial tariffs are correlated with greater reduction in trade barriers.

The patterns for other macroeconomic variables are more divergent across developed and developing countries. In stark contrast to developed nations, higher growth in developing countries is associated with *lower* reductions in less tariff reduction. This may reflect a belief among developing country policy makers that trade liberalization is a

response to weak economic growth whereas developed country leaders may be hesitant to liberalize during similar economic downturns. The coefficient on INFLATION is also quite different for developing nations; it is negative and significantly different from zero at a 1 percent level in all specifications in Table 6. In other words, higher inflation seems to make developing nations more wary about reducing tariffs.

The most important results for this paper, however, correspond to the estimates for the various antidumping variables for developing countries. In particular, we see no evidence for these nations that the use of antidumping has contributed in any systematic way to trade liberalization. The results displayed in the last four columns of Table 6 show that the only statistically significant coefficients are found for COUNTRY_AD_INIT and COUNTRY_AD_MEAS_3. The latter estimate is *negative* suggesting that imposing duties has hurt rather than helped trade liberalization. Overall, these results do not provide unequivocal evidence that antidumping is necessary for trade liberalization, at least among developing countries.

In conclusion, we find that the effects of some explanatory variables for trade liberalization are similar across developed and developing country, most notably, real per capita income, initial tariff levels and current account size. However, we see very different results for economic growth and inflation. Most importantly for this study, there are strong indications that these two groups of countries have had very different experiences with antidumping.

IV. B. Outcomes with Country/Industry Specific Effects

The regressions above have a major potential shortcoming since they do not control for

country/industry fixed effects. It is certainly plausible that tariff reductions are affected profoundly by the experience by a particular industry in a particular country. In this section, we try to exploit some of the variation at the country/industry level.

We try to control for country/industry specific effects through three measures.

The first involves initial sectoral tariffs. We include the industry's initial tariff level (SECTOR_TARIFF) and its square (SECTOR_TARIFF_SQUARED) in place of the analogs calculated for country averages as in the previous section. These values control at least part of any past political economy effects and industry shocks at the sectoral level in each country. For example, industries with strong clout or have been favored by governments in the past may have higher initial tariffs.

We also use antidumping data at the individual industry level. In the previous section, we included only the total number of antidumping investigations or measures in the country. Here we include the number of antidumping investigations initiation contemporaneous to the tariff reduction's base year (SECTOR_AD_INIT) as well as for a three year period (SECTOR_AD_INIT_3) as well as the analogs for the antidumping orders in place (SECTOR_AD_MEAS) as well as for a three year period (SECTOR_AD_MEAS_3). We also include one final version for antidumping in this section as a sensitivity test: SECTOR_AD_INIT_5 and SECTOR_AD_MEAS_5 are five year versions of these variables.

Finally, we control for unobservable effects at the sector level by country by country/industry fixed effects.

The results for the separated developed and developing country samples are displayed in Tables 7 and 8 below. We see that much more of the variation in the

dependent variable is explained when exploiting the country/industry variation compared to the earlier specifications.

The results for most of the macroeconomic control variables for developed countries (Table 7) are very similar to those in Table 5. However, we do see that the coefficient on INFLATION has a much more stable pattern in this specification and is consistently negative and significantly different from zero at a 5 percent level in each column.

The antidumping variables provide less explanatory power in this version of the econometric model for developed countries. The parameter estimates for the contemporaneous number of antidumping initiations (SECTOR_AD_INIT) and measures (SECTOR_AD_MEAS) are both positive and significantly different from zero, though the latter only at 7.4 percent. We also see that the impact of sectoral antidumping use on trade liberalization is sensitive to the time frame used. In particular, columns 3-6 show the 3- and 5-year versions of the antidumping variables. The point estimates for the initiations variables fall as the time frame is extended (1.5 vs. 0.49 vs. 0.43), and also their significance decreases from one percent to insignificant. The same pattern for the point estimates holds for the "measures" variable (2.2 vs. 0.79 vs. -0.37) with only SECTOR_AD_MEAS significantly different from zero although only at 10 percent level.

There are at least two interpretations for these results for developed countries. The first is that the antidumping results are not robust to slightly different versions. The second is that antidumping does act as a safety valve but that industries have a short time horizon: very recent antidumping investigations and duties might help industries acquiesce to tariff reductions but past antidumping activity is discounted heavily.

In Table 8 we display the results when developing countries are included with country/industry fixed effects and sectoral variation in the control variables. We see that the general pattern that exists for macroeconomic variables in Table 8 are mirrored in Table 6. Most importantly, we find once again little evidence that antidumping use has been closely associated with tariff reductions in developing countries. All versions for antidumping initiations and measures imposed (contemporaneous, 3-year and 5-year stock) are insignificant. Recall that in the earlier version for developing countries (Table 6) we only found two statistically significant coefficients – and the one for COUNTRY_AD_MEAS_3 was negative. In other words, we have found no consistent patterns in either versions of the econometric model between the antidumping system and developing country experience with trade liberalization.

IV. C. Sensitivity Analysis

In this section, we present a short description of other specifications we examined that assess the robustness of our results.[14]

One potential problem exists in the analysis that is especially relevant for developed countries. As noted above, the tariffs used in constructing the dependent variables are the applied (i.e., statutory) rather than bound (i.e., those agreed upon at multilateral trade negotiations) rates. For many developing countries, there is a substantial "overhang," (i.e., the bound tariffs are much higher than applied tariffs) so that there is significant discretion available to governments that want to change their trade policy without violating international commitments. Using the latter, as we have in this study so

[14] Not all the estimation results are reported in order to save on space but they are available on request.

far, is thus an appropriate measure of the way in which developing country governments react to a changing economic and political environment.

In contrast, many developed countries have applied tariffs very close to their bound tariffs so that changes in sectoral tariff rates in any particular sector could simply represent the government implementing past multilateral trade agreements. Francois and Martin (2003) report post Uruguay Round average binding overhangs (i.e., the gap between bound and applied rates) of only 0.4, 0.1 and 0.2 percentage points in the EU, Japan and the U.S., respectively. In comparison, Brazilian and Indian binding overhangs were 14.9 and 3.9 percentage points. We therefore conduct a sensitivity test for developed countries alone by forcing the periods of analysis to be the five years prior and subsequent to the completion of the Uruguay Round. This data strategy does reduce the developed country sample size from 582 to 251 observations.

The results are displayed in columns 1 through 3 in Table 9 and are analogous to the same columns in Table 7. The estimates for the macroeconomic variables are generally similar to the earlier version in terms of signs and significance. The one exception is for CA/GDP; in this specification, a larger surplus is associated with less liberalization. This may reflect the experience of the United States, which had a significant current account deficit during this period but nonetheless liberalized.

The results for the antidumping variables are weaker than in Table 7. The only coefficient estimated to be significantly different from zero is for the contemporaneous number of initiations (SECTOR_AD_INIT) but with a marginal significance of only 7.5 percent. All other antidumping variables seem not to explain tariff liberalization in the immediate pre- and post-Uruguay Round period.

Another conceptual concern might be that we have included countries that either did not have an antidumping law or did not invoke the law in the period under study. For the first concern, we exclude all countries without an antidumping process in place (i.e., Nepal, Oman, Switzerland, Tanzania). The results for developed countries without Switzerland are qualitatively identical to those presented in Table 7. When developing countries without antidumping laws are excluded, the coefficient for per capita income growth (which was reported in Table 8 as insignificant) is negative and significantly different from zero at a five percent level but the antidumping regressors remain insignificant. We also exclude countries that never used antidumping (whether they had a law or not). For developed countries, this means dropping Norway in addition to Switzerland. Bangladesh, Nepal, Oman, Saudi Arabia, and Tanzania are excluded for the developing country sample. These results mirror those noted above in this paragraph.[15]

Another potential problem is that our dependent variable is censored at 100 since tariff rates cannot be negative. There are only 25 of such occurrences in our dataset and all for developed countries. Such a small proportion of censored observations should not bias the OLS results. In any case, we use tobit regressions for developed countries to properly address this problem. As expected, there are no qualitatively or quantitative differences with respect to the estimation results presented in Table 7 (except that SECTOR_AD_MEAS_3 is significant at 10%).

Developing countries liberalization efforts also differ from developed countries since the former are sometime recipients of significant foreign aid flows or subject to IMF

[15] We also used specifications that excluded food-processing sectors (ISIC 311-314) since agriculture-related sectors may have different political considerations. In another sensitivity check, the United States, a country with fervent antidumping supporters, was also excluded. These perturbations did not change the qualitative results of the estimation results.

programs. In the final columns of Table 9, we report results for developing countries when we control for three types of three year totals of international financial flows (all of which are lagged five years from the end of the trade liberalization episode): 1) IMF nonconcessional loans; 2) International Development Association (IDA) loans; and 3) World Bank (IBRD) loans. The first of these involves loans that come as part of reform packages for countries with balance of payments crises. We expect the dispersal of these funds to be positively correlated with trade liberalization since the IMF generally supports trade reform. The latter two, both of which involve concessional loans, have an ambiguous sign; perhaps they help developing countries push through trade policy reform or may allow countries to avoid the painful process of reducing tariffs.

We see in columns 5 through 8 of Table 9 that IMF loans are positively correlated with trade liberalization while IDA loans seem to discourage reduction in trade barriers and IBRD loans are not statistically significant determinants.[16] Once again, however, we see no evidence for developing countries that the various measures of antidumping activity are positively correlated with trade liberalization.

We conclude by discussing one final robustness test. The trade liberalization measure we have used up to this point is the simple percentage change in tariffs. As Finger et al. (1996) have noted, this treats a tariff level change from 2 percent to 1 percent as identical to a change from 40 to 20 percent. Consequently, we followed their lead and re-ran our regressions using

$$\Delta t^{*}_{k,i,t} = -\left[\frac{t_{k,i,t} - t_{k,i,t-5}}{1 + t_{k,i,t-5}}\right] x\, 100\,. \qquad (3)$$

[16] The same results obtain if these financial flows are included one at the time instead of all together. The highest correlation among these three variables is only –0.33.

The results, not reported here but available upon request, suggest that some of the results for the use of antidumping are sensitive to this change.[17] For the entire sample of developed and developing countries using only country-wide use of antidumping (i.e., analogous to Table 4), we find that the number of antidumping investigations (COUNTRY_AD_INIT) is now *negative* and significant at a 1 percent level while the totals of investigations (COUNTRY_AD_INIT_3) and measures imposed (COUNTRY_AD_MEAS_3), which were positive and significant at a one percent level in Table 4, are no longer statistically significant.

The results for antidumping among developed countries (analogous to Table 5) are essentially unchanged by the new specification. For developing countries (i.e., similar to Table 6), we find that COUNTRY_AD_INIT, which was positive and significant at a five percent level in the original specification no longer retains that explanatory power while COUNTRY_AD_MEAS_3 maintains its negative sign and is now significantly different from zero at one percent.

But the most notable changes in the new specification is when we look at sectoral variation for developing countries (analogous to Table 8). We find that all antidumping variables are now negatively correlated with trade liberalization in developing countries and all are significantly different from zero. This of course is consistent with a world in which antidumping has hindered trade liberalization efforts in developing countries.

[17] As in Finger et al. (1996), the formula in (3) is implemented with the denominator being one plus the average of the initial and final tariff rate.

V. Conclusions

This paper represents the first attempt to evaluate econometrically whether past use of antidumping helps explain later trade liberalization, defined as percentage change in applied tariffs, in a group of 8 developed and 27 developing countries. We control for macroeconomic conditions, initial tariff levels both at the national and sectoral level, industry and country fixed effects and then consider how both the initiation of new antidumping investigations as well as the imposition of final antidumping duties affect reductions in tariff rates in a subsequent period. The particular form of antidumping activity in the analysis is the number of investigations launched or the number of measures imposed in a base year as well as other versions with a longer time frame (either three or five years). We then analyze what factors explain percentage tariff changes in each three-digit ISIC industrial category five years hence.

The initial regression models (Tables 4 through 6) only exploit variation at the national level in the explanatory variables. Evidence for these regressions indicates that when both groups of countries are combined in a single dataset that there is some evidence that antidumping use is correlated with later tariff reductions. In particular, the coefficients for antidumping measures imposed in the base year for the trade liberalization, as well as for the three year total of antidumping investigations and imposed measures prior to the tariff changes, are all positive and significantly different from zero. The estimates suggest than an increase of one case in the three year total number of new investigations could lead to an increase in average tariff reductions by 0.24 percentage points.

These results must be treated with significant caution however. We do not have access to the value of trade affected in each of these antidumping cases so that

investigations involving small and large amounts of trade are treated symmetrically in the data. Government data on which the database is developed often do not list details about the level of duties imposed so that antidumping duties of 2 percent and 50 percent have the same weight in the regressions. If these data were subsequently available on a systematic basis, more definite statements could be made.

But perhaps the most important caveat is that the statistical significance of the antidumping variables is not invariant to the econometric specification or the subsample used for the estimation. For example, the results in the previous paragraph are driven almost entirely by the experience in developed countries. When we analyze the developing countries the coefficients for the antidumping variables do not have a consistent pattern, either in sign or statistical significance.

When we include sectoral variation in the controls and allow for industry/country fixed effects (i.e., Tables 7 and 8), the explanatory power of antidumping use is less consistent. The econometric results suggest that antidumping was not an important component to reducing tariffs in the sample period for developing countries. For developed countries, the positive relationship between antidumping use and trade liberalization found above was less robust and consistent than in the previous specification. And this relationship was even more tenuous when we examined the immediate pre- and post-Uruguay Round period for developed countries. Finally, when we define trade liberalization in an alternative fashion, we see evidence that developing countries are *less* likely to reduce tariffs when they either launch investigations or impose antidumping duties in the same 3-digit ISIC sector.

A final assessment about whether an antidumping process yields net economic benefits because of its impact on trade liberalization would require further work. In principle, one would need to compare the economic inefficiencies created by the entire antidumping system with the possible increase in trade liberalization in developed countries indicated in this study. The answer is ultimately an empirical question and our results shed little light on this subject other than to say that there is some evidence that such a trade-off might exist. And our results say nothing about whether other trade policy "safety-valves," such as safeguard actions or compensatory transfers to trade liberalization's losers, would not have provided the same political "cover" but with fewer economic distortions. Nonetheless, there seem to be at least some weak and fragmentary evidence that antidumping proponents' arguments that the system may help trade liberalization cannot be dismissed out of hand, at least for developed countries. Developing countries trade reform efforts, on the other hand, seem to be, if anything, hindered by their own use of antidumping measures.

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Table 1: Countries List and Summary Statistics

Countries	Average Initial Tariff Level	Average Final Tariff Level	Antidumping Initiations	Antidumping Measures Imposed	Antidumping Success Rate
Developed Countries					
Australia	13.78 (1991)	4.66 (2001)	331	105	31.7%
Canada	10.23 (1989)	4.09 (2004)	200	134	67.0%
European Union	5.74 (1988)	3.82 (2003)	481	309	64.2%
Japan	5.57 (1988)	5.04 (2003)	6	4	66.7%
New Zealand	10.43 (1992)	4.14 (2002)	56	20	35.7%
Norway	5.78 (1988)	0.45 (2003)	0	0	--
Switzerland	0.00 (1990)	0.00 (2004)	No AD law	No AD law	--
United States	5.43 (1989)	3.14 (2004)	559	282	50.4%
Developed country average	7.12	3.17			52.6%
Developing Countries					
Argentina	14.18 (1992)	14.35 (2002)	210	121	57.6%
Bangladesh	117.98 (1989)	20.26 (2004)	0	0	--
Bolivia	9.90 (1993)	9.90 (2003)	0	0	--
Brazil	43.73 (1989)	14.10 (2004)	146	66	45.2%
Chile	10.94 (1992)	6.96 (2002)	14	6	42.9%
China	44.95 (1992)	13.34 (2002)	62	16	25.8%
Colombia	7.60 (1991)	12.89 (2002)	38	21	55.3%
Ecuador	10.66 (1993)	12.61 (2003)	4	2	50.0%
Hungary	10.67 (1991)	6.83 (2002	0	0	--
India	58.32 (1992)	28.13 (2004)	325	215	66.2%
Indonesia	25.53 (1989)	7.34 (2004)	37	15	40.5%
Malaysia	18.17 (1988)	11.78 (2001)	17	11	64.7%
Mexico	14.21 (1991)	18.56 (2001)	200	100	50.0%
Nepal	19.65 (1993)	16.31 (2003)	No AD law	No AD law	--
Oman	5.28 (1992)	7.36 (2002)	No AD law	No AD law	--
Paraguay	19.77 (1991)	13.48 (2001)	2	1	50.0%
Peru	18.70 (1993)	10.43 (2004)	88	40	45.5%
Philippines	30.91 (1988)	4.88 (2003)	28	14	50.0%
Saudi Arabia	12.55 (1994)	6.67 (2004)	0	0	--
South Africa	12.82 (1988)	9.67 (1998)	170	64	37.6%
Tanzania	17.53 (1993)	15.26 (2003)	No AD law	No AD law	--
Thailand	44.27 (1989)	17.55 (2000)	9	6	66.7%
Trinidad and Tobago	19.48 (1991)	8.76 (2001)	4	3	75.0%
Tunisia	29.96 (1990)	26.14 (2003)	0	0	--
Turkey	9.74 (1993)	3.88 (2003)	75	38	50.7%
Uruguay	7.89 (1992)	13.70 (2002)	4	2	50.0%
Venezuela	20.04 (1992)	13.30 (2002)	26	16	61.5%
Developing country average	24.27	12.76			51.8%
Overall average	20.35	10.56			52.1%

Notes: the years in parenthesis are for the first and last year included in the regressions; Antidumping initiations and measures are the totals for the period defined by the year in parenthesis (or shorter for countries that adopted an antidumping law sometimes in between) for ISIC 321-390.

Table 2: Industry Classification and Summary Statistics

ISIC Classification (revision 2)	**Average** $\Delta t_{k,i,t}$	**Antidumping Investigations**		**Antidumping Measures Imposed**	
311 Food products	-0.31	104	(3.22)	55	(3.29)
312 Food products (others)	5.37	28	(0.87)	5	(0.30)
313 Beverages	-23.12	3	(0.09)	1	(0.06)
314 Tobacco	-20.93	1	(0.03)	0	(0.00)
321 Textiles	8.23	212	(6.57)	91	(5.44)
322 Wearing apparel except footwear	-4.65	38	(1.18)	11	(0.66)
323 Leather products	16.10	8	(0.25)	1	(0.06)
324 Footwear except rubber or plastic	12.02	45	(1.39)	31	(1.85)
331 Wood products except furniture	17.36	8	(0.25)	7	(0.42)
332 Furniture except metal	17.01	1	(0.03)	0	(0.00)
341 Paper and products	17.76	124	(3.84)	53	(3.17)
342 Printing and publishing	18.53	12	(0.37)	8	(0.48)
351 Industrial chemicals	11.79	862	(26.70)	446	(26.67)
352 Other chemicals	16.82	56	(1.73)	27	(1.61)
353 Petroleum refineries	8.81	2	(0.03)	0	(0.00)
354 Miscellaneous petroleum and coal products	15.84	6	(0.19)	4	(0.24)
355 Rubber products	14.00	44	(1.36)	25	(1.50)
356 Plastic products	13.06	36	(1.12)	18	(1.08)
361 Pottery china earthenware	13.75	1	(0.03)	1	(0.06)
362 Glass and products	15.80	67	(2.08)	23	(1.38)
369 Other non-metallic mineral products	17.75	55	(1.70)	30	(1.79)
371 Iron and steel	9.13	882	(27.32)	492	(29.43)
372 Non-ferrous metals	12.91	55	(1.70)	24	(1.44)
381 Fabricated metal products	14.93	114	(3.53)	75	(4.49)
382 Machinery except electrical	17.59	125	(3.87)	62	(3.71)
383 Machinery electric	18.92	149	(4.62)	91	(5.44)
384 Transport equipment	14.32	42	(1.30)	20	(1.20)
385 Professional and scientific equipment	18.08	63	(1.95)	25	(1.50)
390 Other manufactured products	18.02	85	(2.63)	46	(2.75)
Overall	10.86	3,228		1,672	

Notes: $\Delta t_{k,i,t} = -\left[\frac{t_{k,i,t} - t_{k,i,t-5}}{t_{k,i,t-5}}\right] x\, 100$ so that tariff reductions are positive numbers; antidumping initiations and measures are the totals for the periods defined in Table 1; percentages of total cases reported in parenthesis.

Table 3: Data Description

	Description	**Source**
Dependent Variable		
Sectoral Trade Liberalization	Negative of percentage change (5 years) in SECTOR_TARIFF	
Explanatory Variables		
SECTOR_TARIFF	Sector simple average of applied tariff rates	World Bank (2001)
SECTOR_TARIFF_SQUARED	$(SECTOR\_TARIFF)^2$	World Bank (2001)
COUNTRY_TARIFF	Country simple average of applied tariff rates	World Bank (2001)
COUNTRY_TARIFF_SQUARED	$(COUNTRY\_TARIFF)^2$	World Bank (2001)
GDP/CAP	Three year average of GDP per capita	World Development Indicators (WDI)
INFLATION	Three year average of percentage change of GDP deflator (or consumer prices)	World Development Indicators (WDI)
GROWTH	Three year average of growth of real GDP per capita	World Development Indicators (WDI)
CA/GDP	Three year average of current account as a percentage of GDP	World Development Indicators (WDI)
IMF NON-CONCESSIONARY	Three year average of net IMF nonconcessional loans as a percentage of GDP	World Development Indicators (WDI)
IBRD	Three year average of net IBRD loans as a percentage of GDP	World Development Indicators (WDI)
IDA	Three year average of net IDA loans as a percentage of GDP	World Development Indicators (WDI)
SECTOR_AD_INIT	Number of AD petitions initiated in a sector	Collected by authors from government sources.
SECTOR_AD_MEAS	Number of AD measures imposed in a sector	Collected by authors from government sources.
SECTOR_AD_INIT_3	Three year average of SECTOR_AD_INIT	Collected by authors from government sources.
SECTOR_AD_MEAS_3	Three year average of SECTOR_AD_MEAS	Collected by authors from government sources.
SECTOR_AD_INIT_5	Five year average of SECTOR_AD_INIT	Collected by authors from government sources.
SECTOR_AD_MEAS_5	Five year average of SECTOR_AD_MEAS	Collected by authors from government sources.
COUNTRY_AD_INIT	Country average of SECTOR_AD_INIT	Collected by authors from government sources.
COUNTRY_AD_MEAS	Country average of SECTOR_AD_MEAS	Collected by authors from government sources.
COUNTRY_AD_INIT_3	Country average of SECTOR_AD_INIT_3	Collected by authors from government sources.
COUNTRY_AD_MEAS_3	Country average of SECTOR_AD_MEAS_3	Collected by authors from government sources.

Notes: Alessandro Nicita kindly provided an update to 2004 of the data available from World Bank (2001).

Table 4: All Countries

	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Dependent variable: Average Sectoral Tariff Reduction	10.93 (72.31)						
COUNTRY_TARIFF [i)]	18.41 (17.90)	3.009*** (0.330)	3.022*** (0.333)	3.036*** (0.335)	3.182*** (0.336)	3.260*** (0.344)	3.279*** (0.364)
COUNTRY_TARIFF_SQUARED	659.36 (1,865.89)	-0.021*** (0.003)	-0.022*** (0.003)	-0.022*** (0.003)	-0.022*** (0.003)	-0.023*** (0.003)	-0.023*** (0.003)
GDP/CAP	9,248.00 (11,536.94)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
INFLATION	55.41 (224.03)	-0.033*** (0.004)	-0.033*** (0.005)	-0.033*** (0.005)	-0.030*** (0.005)	-0.032*** (0.005)	-0.029*** (0.005)
GROWTH	2.15 (2.63)	0.781 (0.534)	0.762 (0.529)	0.843 (0.532)	1.481*** (0.540)	1.439*** (0.554)	1.225** (0.564)
CA/GDP	-1.54 (3.97)	2.749*** (0.575)	2.733*** (0.576)	2.723*** (0.576)	2.768*** (0.572)	2.781*** (0.574)	2.728*** (0.574)
COUNTRY_AD_INIT	7.07 (14.03)			0.099 (0.074)			
COUNTRY_AD_MEAS	3.96 (7.62)				1.379*** (0.162)		
COUNTRY_AD_INIT_3	19.62 (35.81)					0.268*** (0.038)	
COUNTRY_AD_MEAS_3	10.84 (19.78)						0.366*** (0.100)
Country Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
Industry Fixed Effects (Prob > F)			Y (0.28)	Y (0.28)	Y (0.26)	Y (0.27)	Y (0.28)
R-squared		0.16	0.18	0.18	0.19	0.18	0.18
Observations		2,261	2,261	2,261	2,261	2,261	2,261

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; i) All variables are lagged to the base year used in the calculation of the tariff reduction.

Table 5: Developed Countries

	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5
Dependent variable: Average Sectoral Tariff Reduction	23.19 (37.71)					
COUNTRY_TARIFF [i)]	7.11 (3.40)	35.446*** (7.374)	41.975*** (7.981)	28.895*** (7.442)	29.048*** (7.314)	5.470 (8.155)
COUNTRY_TARIFF_SQUARED	62.14 (56.69)	-1.743*** (0.377)	-2.144*** (0.415)	-1.427*** (0.381)	-1.401*** (0.374)	-0.024 (0.430)
GDP/CAP	27,396.26 (7,562.07)	0.003*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
INFLATION	2.21 (1.31)	-3.547* (2.168)	-6.333*** (2.357)	0.059 (2.109)	-5.545*** (2.041)	2.393 (2.064)
GROWTH	1.89 (1.57)	5.472*** (0.911)	7.402*** (1.095)	7.414*** (0.996)	0.096*** (0.010)	12.320*** (1.183)
CA/GDP	-0.60 (3.53)	6.380*** (0.781)	5.160*** (0.843)	6.402*** (0.732)	4.943*** (0.008)	5.750*** (0.703)
COUNTRY_AD_INIT	17.16 (20.16)		0.641*** (0.162)			
COUNTRY_AD_MEAS	10.75 (11.26)			1.567*** (0.224)		
COUNTRY_AD_INIT_3	51.40 (51.92)				0.562*** (0.044)	
COUNTRY_AD_MEAS_3	28.96 (27.00)					3.027*** (0.305)
Country Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
Industry Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
R-squared		0.37	0.39	0.42	0.44	0.48
Observations		582	582	582	582	582

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; i) All variables are lagged to the base year used in the calculation of the tariff reduction.

Table 6: Developing Countries

	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5
Dependent variable: Average Sectoral Tariff Reduction	6.68 (80.50)					
COUNTRY_TARIFF [i)]	22.33 (19.19)	3.345*** (0.348)	3.504*** (0.387)	3.468*** (0.379)	3.327*** (0.402)	3.164*** (0.381)
COUNTRY_TARIFF_SQUARED	866.38 (2,126.35)	-0.024*** (0.003)	-0.025*** (0.003)	-0.025*** (0.003)	-0.024*** (0.003)	-0.023*** (0.003)
GDP/CAP	2,957.17 (2,373.29)	0.025*** (0.006)	0.025*** (0.006)	0.025*** (0.007)	0.025*** (0.006)	0.026*** (0.007)
INFLATION	82.34 (273.48)	-0.033*** (0.005)	-0.033*** (0.005)	-0.031*** (0.006)	-0.033*** (0.005)	-0.037*** (0.006)
GROWTH	2.24 (2.90)	-1.231* (0.690)	-1.226* (0.689)	-0.992 (0.759)	-1.247* (0.715)	-1.552** (0.750)
CA/GDP	-1.87 (4.05)	3.747*** (0.739)	3.664*** (0.737)	3.664*** (0.747)	3.753*** (0.739)	3.832*** (0.744)
COUNTRY_AD_INIT	3.57 (8.76)		0.288** (0.138)			
COUNTRY_AD_MEAS	1.61 (3.58)			0.635 (0.413)		
COUNTRY_AD_INIT_3	8.60 (17.96)				-0.014 (0.081)	
COUNTRY_AD_MEAS_3	4.90 (11.73)					-0.280** (0.118)
Country Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
Industry Fixed Effects (Prob > F)		Y (0.64)	Y (0.64)	Y (0.64)	Y (0.64)	Y (0.63)
R-squared		0.18	0.18	0.18	0.18	0.18
Observations		1,679	1,679	1,679	1,679	1,679

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; i) All variables are lagged to the base year used in the calculation of the tariff reduction.

Table 7: Developed Countries

	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Dependent variable: Average Sectoral Tariff Reduction	23.19 (37.71)						
SECTOR_TARIFF [i)]	7.11 (3.40)	10.742*** (1.890)	10.710*** (1.914)	10.671*** (1.890)	10.693*** (1.891)	10.867*** (1.918)	10.951*** (1.954)
SECTOR_TARIFF_SQUARED	62.14 (56.69)	-0.097*** (0.022)	-0.097*** (0.022)	-0.096*** (0.022)	-0.096*** (0.022)	-0.098*** (0.022)	-0.100*** (0.023)
GDP/CAP	27,396.26 (7,562.07)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
INFLATION	2.21 (1.31)	-5.555** (2.225)	-5.270** (2.241)	-5.470** (2.218)	-5.380** (2.222)	-6.124*** (2.337)	-5.970** (2.351)
GROWTH	1.89 (1.57)	6.997*** (1.092)	6.909*** (1.094)	6.924*** (1.089)	6.853*** (1.087)	6.280*** (1.077)	6.250*** (1.085)
CA/GDP	-0.60 (3.53)	5.482*** (1.157)	5.571*** (1.154)	5.529*** (1.154)	5.562*** (1.154)	5.625*** (1.173)	5.676*** (1.173)
SECTOR_AD_INIT	0.60 (2.98)	1.551*** (0.449)					
SECTOR_AD_MEAS	0.37 (1.76)		2.209* (1.230)				
SECTOR_AD_INIT_3	1.79 (7.82)			0.494** (0.247)			
SECTOR_AD_MEAS_3	0.97 (4.04)				0.785 (0.560)		
SECTOR_AD_INIT_5	3.10 (10.43)					0.433 (0.368)	
SECTOR_AD_MEAS_5	1.71 (6.07)						-0.370 (0.594)
Country/Industry Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
R-squared		0.61	0.60	0.60	0.60	0.60	0.60
Observations		582	582	582	582	572	572

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; Means and standard deviations calculated for the 582 observations used in the first four columns, except for SECTOR_AD_INIT_5 and SECTOR_AD_MEAS_5 whose means and standard deviations are calculated over 572 observations; i) All variables are lagged to the base year used in the calculation of the tariff reduction.

Table 8: Developing Countries

	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Dependent variable: Average Sectoral Tariff Reduction	6.68 (80.50)						
SECTOR_TARIFF [i)]	22.33 (19.19)	3.124*** (0.790)	3.120*** (0.787)	3.118*** (0.793)	3.115*** (0.790)	4.302*** (1.062)	4.299*** (1.058)
SECTOR_TARIFF_SQUARED	866.38 (2,126.35)	-0.012*** (0.004)	-0.011*** (0.004)	-0.011*** (0.004)	-0.011*** (0.004)	-0.020*** (0.007)	-0.020*** (0.007)
GDP/CAP	2,957.17 (2,373.29)	0.026*** (0.006)	0.026*** (0.006)	0.026*** (0.006)	0.026*** (0.006)	0.024*** (0.006)	0.024*** (0.006)
INFLATION	82.34 (273.48)	-0.035*** (0.006)	-0.035*** (0.006)	-0.035*** (0.006)	-0.035*** (0.006)	-0.026*** (0.006)	-0.026*** (0.006)
GROWTH	2.24 (2.90)	-0.073 (0.864)	-0.050 (0.769)	-0.067 (0.767)	-0.068 (0.770)	-1.482** (0.708)	-1.487** (0.709)
CA/GDP	-1.87 (4.05)	4.108*** (0.696)	4.108*** (0.696)	4.112*** (0.696)	4.112*** (0.697)	2.847*** (0.654)	2.846*** (0.654)
SECTOR_AD_INIT	0.12 (1.11)	1.139 (0.879)					
SECTOR_AD_MEAS	0.05 (0.52)		1.964 (1.869)				
SECTOR_AD_INIT_3	0.30 (1.99)			0.229 (0.526)			
SECTOR_AD_MEAS_3	0.17 (1.22)				0.202 (0.780)		
SECTOR_AD_INIT_5	0.53 (2.98)					0.239 (0.432)	
SECTOR_AD_MEAS_5	0.22 (1.49)						0.386 (0.734)
Country/Industry Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
R-squared		0.56	0.56	0.56	0.56	0.58	0.58
Observations		1,679	1,679	1,679	1,679	1,650	1,650

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; Means and standard deviations calculated for the 1,679 observations used in the first four columns, except for SECTOR_AD_INIT_5 and SECTOR_AD_MEAS_5 whose means and standard deviations are calculated over 1,650 observations; i) All variables are lagged to the base year used in the calculation of the tariff reduction.

Table 9: Sensitivity Results

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Dependent variable: Average Sectoral Tariff Reduction								
SECTOR_TARIFF [i)]	25.639*** (5.592)	26.308*** (6.285)	26.251*** (6.257)	26.206*** (6.255)	3.307*** (0.802)	3.303*** (0.799)	3.299*** (0.804)	3.296*** (0.801)
SECTOR_TARIFF_SQUARED	-0.773*** (0.238)	-0.795*** (0.261)	-0.792*** (0.260)	-0.790*** (0.259)	-0.012*** (0.004)	-0.012*** (0.004)	-0.012*** (0.004)	-0.012*** (0.004)
GDP/CAP	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.019*** (0.006)	0.019*** (0.006)	0.019*** (0.006)	0.019*** (0.006)
INFLATION	-40.330*** (2.251)	-40.792*** (2.254)	-40.750*** (2.282)	-40.794*** (2.260)	-0.027*** (0.006)	-0.027*** (0.006)	-0.027*** (0.006)	-0.027*** (0.006)
GROWTH	32.465*** (3.484)	33.123*** (3.433)	33.176*** (3.476)	33.284*** (3.430)	0.860 (0.950)	0.880 (0.952)	0.861 (0.953)	0.854 (0.954)
CA/GDP	-8.073*** (1.598)	-8.001*** (1.603)	-7.948*** (1.622)	-7.895*** (1.600)	1.962** (0.779)	1.961** (0.779)	1.964** (0.778)	1.962** (0.778)
IMF NON-CONCESSIONARY					3.666*** (0.819)	3.666*** (0.820)	3.671*** (0.817)	3.676*** (0.815)
IBRD					-2.225 (1.575)	-2.246 (1.580)	-2.245 (1.570)	-2.259 (1.570)
IDA					-8.978*** (1.928)	-8.981*** (1.928)	-8.990*** (1.925)	-9.001*** (1.925)
SECTOR_AD_INIT	0.959* (0.533)				0.997 (0.823)			
SECTOR_AD_MEAS		0.346 (0.810)				1.684 (1.923)		
SECTOR_AD_INIT_3			0.053 (0.111)				0.068 (0.512)	
SECTOR_AD_MEAS_3				0.139 (0.248)				-0.139 (0.780)
Country/Industry Fixed Effects (Prob > F)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)	Y (0.00)
R-squared	0.91	0.91	0.91	0.91	0.57	0.57	0.57	0.57
Observations	251	251	251	251	1,679	1,679	1,679	1,679

Notes: Robust standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob > F reports the probability of the joint test that all fixed effect are statistically significant; i) All variables are lagged to the base year used in the calculation of the tariff reduction.