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Abstract

Some supporters of antidumping have argued that this procedure serves as a kind of “safety valve” for protectionist pressure. In this paper, we investigate whether there is empirical evidence that the use of antidumping actions has contributed to ongoing tariff reductions over the period 1988 to 2004 in a sample of 23 developing countries, some of which have become aggressive users of antidumping in recent years. The evidence is not supportive of the safety valve argument for these countries. Instead, evidence suggests that past use of antidumping may have led to less rather than more trade liberalization.

Keywords: Antidumping, Trade Liberalization, Commercial Policy

JEL Codes: F13, F14, O19

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Introduction

Developing countries have used antidumping measures much more frequently in recent years. This represents a sharp divergence from the past where a handful of developed countries were the prime users of this WTO consistent import restriction. Not surprisingly, economic researchers on antidumping (AD) traditionally have focused much more intensively on understanding its use in developed countries so that the implications of antidumping use by developing countries is only vaguely understood.

This paper adds to a nascent strand of literature that focuses specifically on developing country use of antidumping.¹ The specific question is whether there is any evidence that antidumping has been used as a kind of “safety valve” for protectionist pressures that has allowed developing country governments to raise barriers on a small number of products even as they have become generally more open to international trade flows. For example, Miranda et al. (1998) study the emerging patterns of antidumping use from 1987 through 1997 in developing countries and 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. Finger and Nogués (2005) have recently documented instances in Latin America where antidumping may have played such a role. If this safety valve argument is borne out by analyzing data in a broad set of developing countries, the rise of antidumping in developing countries may be less troubling than it at first appears. If the evidence is lacking, then its greater use should be of concern for those who believe that a liberal trade regime is important for developing countries’ economic welfare.

Antidumping actions have long been a part of the multilateral trading system. World Trade Organization (WTO) rules, and the General Agreement on Trade and Tariffs before it, allow these duties if importing countries’ governments determine that foreign firms price below production cost or home

¹ Prusa (2001) finds that developing countries use of antidumping substantially reduces imports of the targeted products. Vandebussche and Zanardi (2006) provide recent evidence on how the antidumping system has reduced aggregate trade among new users. Bown (2008) explores the determinants of AD initiations in nine developing countries and finds factors similar to developed countries. Niels and ten Kate (2004) and Niels and Francois (2006) analyze the Mexican experience in detail; Bown and Tovar (2008) examine Indian use of antidumping.

market price and that the imports cause injury to a domestic industry. These duties are typically placed on a narrow range of products that are subject to an investigation and affect only the specific firms and countries in the case. Consequently, these discriminatory duties are not reflected in the overall most-favored-nation tariff rates applied by a country.

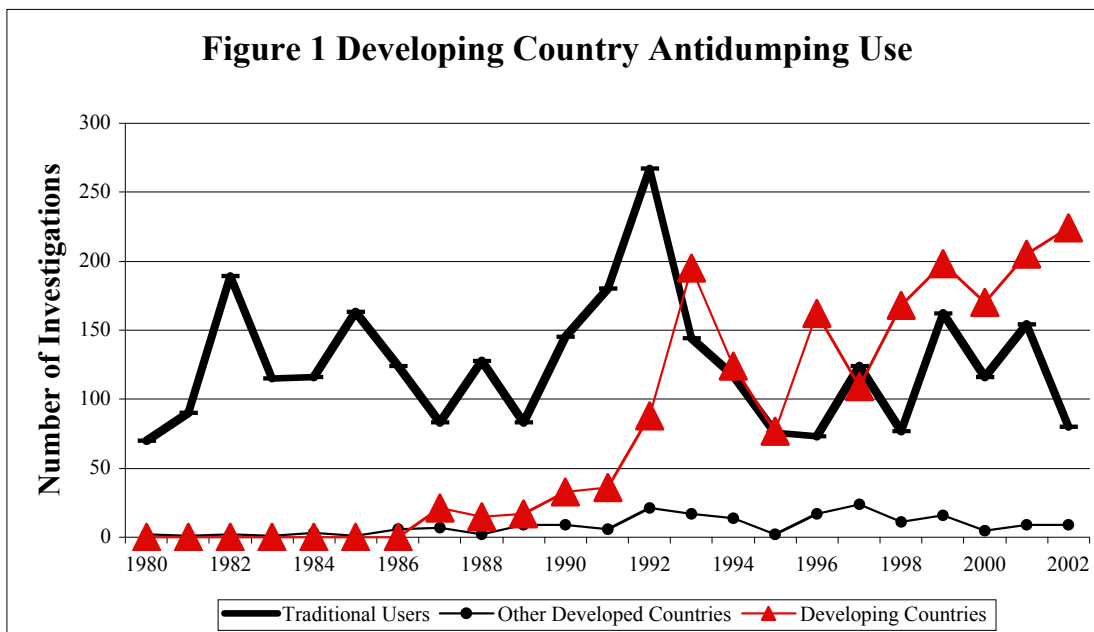
Up until recently, the use of this procedure has been heavily concentrated in the United States, the European Union, Canada, Australia and New Zealand (i.e., the so-called traditional users). Economists, by and large, have argued that these rules are distortionary practices that cause more economic harm than good since antidumping duties are essentially just tariffs. This view typically leads economists to argue that countries should avoid imposing antidumping measures because of the resulting economic inefficiencies. Mankiw and Swagel (2005) go even further by arguing that United States should unilaterally repeal its antidumping law.

A number of analysts have noted that developing countries have begun to use antidumping measures extensively in recent years. Figure 1 demonstrates the recent explosion of use of antidumping in developing countries that essentially did not use antidumping until the mid-1980s. In the early 1990s, this pattern dramatically changed so much that developing countries have initiated more antidumping investigations on an annual basis than the traditional developed country users. More generally, whereas traditional users' initiations have fluctuated within a band between 75 and 160 investigations per year since 1992, developing country usage has risen steadily in this same period and reached about 220 in 2002 alone.

Zanardi (2006) has shown that Argentina, Brazil, India, South Africa and Turkey are among the most frequent worldwide users of antidumping with annual caseloads in the same order of magnitude, and sometimes higher, as the European Union and the United States.² Even more troubling is that the increased use of antidumping by developing countries has a disproportionate impact on other low-income

² If measured in terms of intensity (i.e., initiations per value of imports) these countries make much more intensive use of antidumping compared to the EU and the U.S.

countries. In particular, data collected for this study shows that developing countries target other developing countries in about 60% of their antidumping cases.



Notes: Traditional Users: Australia, Canada, European Union, New Zealand, and United States; Developing countries: countries defined as low- and middle-income by the World Bank in 2005.

The increasing use of antidumping alone might suggest rising protectionism in these developing countries but in fact many of them have undertaken important trade liberalization reforms as a whole, even as they have imposed antidumping measures on specific products. Some authors have suggested that the correlation of lowered overall tariff levels and antidumping use may be no coincidence. Destler (1996) has pointed to a potential benefit of antidumping. He argues 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. Moore and Suranovic (1992, 1994) consider how the existence of antidumping measures can lead protection-seeking firms to choose less distortive means of obtaining import restrictions. As noted above, Finger and Nogués (2005) provide evidence consistent with the safety valve argument in interviews and case studies of Latin American officials. They find that broad trade liberalization was advanced by carefully managing antidumping procedures.

This study represents the first attempt to evaluate empirically this safety valve argument for antidumping. 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.³ We do not analyze whether the use of antidumping is a *sine qua non* for trade liberalization since many of the countries in the data set began to reduce trade barriers even before an antidumping law was in place. We analyze instead whether antidumping can be helpful in an ongoing process of trade liberalization after the procedure is in place.

We use a new antidumping data set developed by the authors and supplemented with information from Bown (2005), both of which are based primarily on individual governments' antidumping publications,⁴ to assess whether the number of antidumping initiations or the final imposition of antidumping duties have contributed to trade liberalization in a sample of 23 developing countries for the 1988 to 2004 period. We also control for each country's trade policies, macroeconomic conditions, and legal system quality as well as industry and country unobservables. The particular set of included developing countries is determined by availability of the dependent variable. We therefore cannot make general statements about developing countries as a whole but instead for only the nations included in the sample. However, it is important to note that the countries included in the formal analysis represent a large majority of the developing countries that are now major users of antidumping. A comparison with the summary statistics reported in Zanardi (2006) shows that the countries in our sample initiated about 83 percent of all antidumping actions by developing countries in the period 1981-2001.⁵

Trade liberalization in this paper is based on changes in applied MFN tariffs for each country at

³ Feinberg and Reynolds (2007) look at a related issue. They investigate whether there is any evidence that trade liberalization leads to more antidumping cases 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. Moore and Zanardi (2007) confirm this result but only for developing countries that are heavy users of antidumping.

⁴ Many earlier studies of global antidumping use have relied on statistics compiled by the WTO. Unfortunately, the government submissions on which these statistics are based are frequently incomplete or inaccurate.

⁵ Our data set also includes South Africa and China that are classified as a developed country and a country in transition, respectively, in Zanardi (2006).

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” rates). Changes in applied tariffs represent the clearest and most easily interpreted modifications in trade policy in a given country.⁶

The econometric results suggest that there is no evidence that past antidumping actions are positively correlated with later reductions in tariff barriers in this sample of developing countries. In fact, the evidence suggests just the opposite so that past antidumping use may have hindered rather than helped trade liberalization. The point estimates indicate that, for the sample as a whole, one additional antidumping measure will lead to an increase in average post-liberalization tariff levels by 0.96 percent. This is a relatively small marginal effect but suggests that the “safety valve” argument for antidumping finds no support in our data, at least for this group of developing nations.

This paper also contributes to the empirical literature on the determinants of trade liberalization in developing countries. Many of the existing studies focus on specific countries’ (e.g., Liu, 2002) or region’s experiences (e.g., Ancharaz, 2003). Instead, our paper makes use of an extended sample of countries over a relatively long time horizon to try to reach general conclusions.

The remainder of the paper is divided into the following sections. Section I includes some descriptive statistics about tariff reductions and antidumping use in the countries included in this study. Section II briefly lays out an analytical framework and outlines the econometric strategy. We discuss the empirical results and their economic significance in section III. Section IV includes some final remarks.

I. Descriptive Statistics

Table 1 provides some basic information about the countries in the data set that were chosen because of available data on sectoral tariff rates.⁷ We see in Table 1 that this was a period of substantial tariff

⁶ The paper does not address other ways in which countries can liberalize, such as changes in non-tariff barriers.

⁷ Our empirical specifications will always include country-industry 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. This constraint explains why countries like South Korea and Taiwan are not part of the dataset. However, as a robustness check we consider specifications with a larger set of countries and only industry fixed effects.

reductions for these nations; the average (applied) tariff rate fell by half from 27.4 percent to just over 14.6 percent. It is important to note that these figures are simple unweighted averages across sectors; changing trade shares will not affect the measured tariff rates. Also note that the averages across countries in Table 1 are not strictly comparable since they involve different time periods.

Column 3 of Table 1 includes the total number of antidumping investigations launched in each country for the entire period. 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 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 measures that were imposed. These outcomes represent the instances where the government decided to act to reduce imports in an antidumping case.

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. India reduced its average tariffs by 49 percent (from 62.18 to 31.48 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 37 percent. These figures 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 58 percent), China (68 percent), and Brazil (68 percent) had relatively small numbers of imposed duties as a percentage of initiated cases (37.5 percent, 25.8 percent, and 45.3 percent, respectively).

The tariff rates used in this study are applied (i.e., statutory) rather than bound (i.e., those agreed upon at multilateral trade negotiations) rates and do not include antidumping and countervailing duties. We use applied tariffs because they are the barriers in place and consequently reflect the choices taken by governments in practice in response to changing economic and political environment. Applied tariffs also

are particularly appropriate for analyzing developing countries since there is a substantial “overhang,” (i.e., the gap between bound and applied rates). Bacchetta and Bora (2001) provide information for a number of developing countries in our data set that indicate substantial tariff overhang across sectors at the end of the 1990s.⁸ For example, the countrywide average overhang of Mexico and South Africa are 17.1 and 8.6, respectively.

In this paper, trade liberalization is defined by changes in tariffs at the three-digit ISIC level (revision 2). The change is calculated from a base year and five years into the future. We believe that five years is a time frame that would allow for most tariff changes to be phased in following a change in trade policy. For a particular country, these variables are included only for non-overlapping periods. For example, if tariff data is available from 1990 through 2000, one observation would be for the 1990-1995 period and the second would be for 1995-2000.

The particular form of the dependent variable follows Finger et al. (1996). We start with the relationship between domestic prices (P), international prices (P^*) and ad valorem tariffs ($1+t$):

$$P = P^* \cdot (1 + t) \quad (1)$$

Totally differentiating and rearranging, we have:

$$\hat{P} - \hat{P}^* = \frac{dt}{(1+t)} \quad (2)$$

where $\hat{}$ denotes percentage change and dt is the change in the ad valorem tariff. For a small country (i.e.,

$\hat{P}^* = 0$), $\frac{dt}{(1+t)}$ measures the adjustment of the domestic price to a tariff change.

An alternative would be to use the simple percentage change in tariffs (dt/t). The disadvantage with that formulation is that a change of tariffs from 100 to 50 percent yields the same value as a change from 2 to 1 percent, i.e., 0.50. The formulation in (2) treats these two differently (0.495 for the former

⁸ Developed countries tariffs have a much lower tariff overhang. Francois and Martin (2003) report post Uruguay Round average binding overhangs of only 0.4, 0.1 and 0.2 percentage points in the EU, Japan and the U.S., respectively. This means that these countries' tariffs cannot be analyzed using the same methodology we use here since there is much less governmental discretion for random five year periods.

and 0.333 for the latter) and thereby gives less weight to changes that occur from already low tariff rates.

We will use the right hand side of (2) in our regressions.⁹ Specifically, we will use the following in the regressions:

$$\Delta t_{k,i,t} = - \left[\frac{t_{k,i,t} - t_{k,i,t-5}}{(100 + t_{k,i,t-5})} \right] \cdot 100 \quad (3)$$

where $t_{k,i,t}$ is the simple average of applied tariff rates in country k , sector i and year t .¹⁰ We will use the average tariff five years prior to the year t as the basis for calculating this variable. Note that we define a reduction in tariffs in a sector as a positive number.

Table 2 reports average trade liberalization (using equation (3)) for the 29 industrial sectors used in the analysis. It also includes antidumping initiations and measures for these sectors. On average, our trade liberalization measure equals 3.94 but with some variation at the sectoral level. For example, the furniture (non-metal) sector liberalized the most (6.43) but the sector was not involved in any antidumping proceeding. The steel and chemical sectors, both of which are heavy users of antidumping in traditional users, have similar patterns among the countries in our sample. They represent 19.4% and 32.6%, respectively, of total initiations (and very similar shares of measures); these sectors had below average tariff liberalization (1.82 and 2.79, respectively).

II. Analytical and Econometric Approach

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

⁹ Note that this measure does not include the effects of changing non-tariff barriers such as quotas, import licenses, and streamlined regulations. For example, one might see an increase in applied tariffs in a particular sector if there is a switch from restrictive quotas to high tariffs. While potentially important, these data are not available on a systematic basis for all of the countries in the sample at the sectoral level.

¹⁰ In the numerator we use 100 because an ad valorem tariff rate of 0.05 is reported as 5.0 in our data.

restrictions. The level of economic development may be correlated with a safety net for those who might bear adjustment costs associated with trade reform. We also expect that the quality of legal institutions in the country might affect the ability of a country to implement the often very complex procedures associated with antidumping. Most importantly, 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 in subsequent periods.

We start by providing a sketch of how the use of antidumping might affect the level of tariff reductions in a country. Suppose that two separate tariffs levels can be in effect for industry i in a particular country. T_{2i} is the tariff level if no liberalization occurs. The other is T_{1i} ($<T_{2i}$), which is the tariff level for industry i that holds if tariffs are lowered.

We associate positive probabilities to both outcomes, where μ is the probability that liberalization occur, i.e., that T_{1i} is realized, and where $(1-\mu)$ is the probability that no liberalization occurs i.e., that T_{2i} is observed. We therefore can write expected tariffs as:

$$E(T_i) = (\mu)T_{1i} + (1-\mu)T_{2i} \quad (4)$$

The specific tariff liberalization undertaken is part of a complex game involving domestic agents and international negotiations. We do not model this game explicitly. Instead, we focus on the *marginal* impact of the past use of antidumping on expected tariff levels.

Suppose that this economy has an antidumping process in place that domestic import-competing industries can use in the period prior to the trade reform. Let $\mu^{AD} = f(AD \text{ cases})$ be the probability of observing T_{1i} , which is an increasing function of the number of antidumping cases (i.e., initiations or measures imposed). For simplicity, we suppose that the antidumping system can affect the probability of observing a given level of trade liberalization but does not change the level of tariff change in the event of liberalization. We therefore can write expected tariffs in the presence of antidumping use as:

$$E(T_i^{AD}) = (\mu^{AD})T_{1i} + (1-\mu^{AD})T_{2i} \quad (5)$$

Consider the difference between expected tariffs in the two tracks:

$$\Delta E(T_i) = (\mu^{AD})T_{1i} + (1-\mu^{AD})T_{2i} - [(\mu)T_{1i} + (1-\mu)T_{2i}] \quad (6)$$

If the presence of antidumping makes no difference in the probability of observing a reduction in tariffs (i.e., $\mu^{AD} = \mu$), expression (6) will be zero. On the other hand, if antidumping does affect the probability of witnessing trade liberalization in a way that differs from the system without antidumping in place, (6) can be written as:

$$\Delta E(T_i) = (\mu^{AD} - \mu) \cdot (T_{1i} - T_{2i}) \quad (7)$$

The sign of (7) depends on the relative size of μ and μ^{AD} since $T_{1i} < T_{2i}$. If antidumping contributes to a higher probability of trade liberalization (i.e., $\mu^{AD} > \mu$) then we would expect more trade liberalization the more that antidumping has been used in the past. We expect the function $f(\cdot)$ to be increasing but we will let the data determine if it is linear or not.

We estimate a reduced form equation that will allow for various types of influences on the degree of tariff reduction. Recall that we have defined trade liberalization in (3) as a *positive* number so that in the empirical analysis we will expect a positive correlation if antidumping leads to greater reductions in tariffs. We assume that the change in tariffs for industry sector i in country k in period t ($\Delta t_{k,i,t}$) can be written as:

$$\Delta t_{k,i,t} = \delta AD_{k,j} + \alpha X_k + \beta Z_i + \mu_{k,i} + \varepsilon_{k,i,t} \quad (8)$$

where $AD_{k,i}$ is a measure of antidumping activities and X_k and Z_i are matrices of country and industry variables, all of which are calculated using earlier periods, as described below. The values δ , α and β are coefficients (to be estimated) for these explanatory variables. We expect that there may be unobserved country-industry effects that are time invariant ($\mu_{k,i}$). We will control for these through the use of country-industry fixed effects instead of separate sets of country and industry fixed effects. A disturbance term is also included ($\varepsilon_{k,i,t}$).

As noted above, the dependent variable (i.e., change in tariffs) is calculated over a five year period. Contemporaneous explanatory variables could cause problems since the level of tariff liberalization could be correlated with same period macro- and industry-level conditions. We therefore

use lagged explanatory variables to control for 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.

We have developed alternative versions of two separate measures of antidumping activity. The first is the total number of antidumping investigations initiated (AD INITIATIONS) for years $t-6$, and $t-7$ for the country in question. 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 as measured by the ability to file antidumping petitions. A second version considers the total number of antidumping measures (i.e., duties, minimum price arrangements, and price undertakings) imposed for those same years (AD MEASURES).¹¹ A large number for this variable means that agents in the economy can see that the antidumping process actually results in import restrictions.

Two alternative versions of these antidumping control variables are created. The first is the country level counts of antidumping activity. We imagine that an industry might acquiesce to trade liberalization in its own sector if it sees that other industries have been able to access the antidumping process. These versions will control for the effects of countrywide use of antidumping. We also control for the use of antidumping in the sector itself. This is to capture the possibility that an industry cares mostly about its own experience with antidumping and is less concerned about overall countrywide use.¹²

The candidates for X_k include variables that describe the macroeconomic condition in the “base period” (the average of years $t-5$, $t-6$, and $t-7$) that do not vary across industrial sectors. The sources and

¹¹ 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.

¹² Trade liberalization of intermediate or final products in principle could result in different effects (see Amiti and Konings, 2007). We do not make this distinction in our analysis for two reasons. First, the classification that we use is too aggregated to allow us to make such a distinction operational. Second, the bulk of antidumping initiations in developing countries involve intermediate products; for example, 78% of the initiations in 1987-2002 in Mexico (Reyes de la Torre and González, 2005), and 92% over 1992-2003 in India (Baruah, 2007).

detailed descriptions for these and all other variables are included in Table 3 while summary statistics are reported with the results for each of the (sub)samples that we employ.

The macroeconomic controls include real GDP per capita (GDP/CAP) to control for the level of economic development in a country. A positive value on this slope coefficient would suggest that the political pressures to resist trade liberalization would fall as the nation's average income increased. Increased incomes may result in 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 indicate that poorer countries are more likely to adopt trade liberalization as a means to eliminate economic inefficiency associated with protectionism. The growth in per capita real GDP (GROWTH/CAP) is also included. 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, instead, could indicate that policy-makers facing poor economic growth might try to use trade liberalization as an impetus to better economic performance.

The average inflation rate (INFLATION) is included although we do not have *a priori* expectations for this variable. One might imagine that countries could 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. 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.

We also include the average current account as a percentage of GDP (CA/GDP), whose expected sign 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. Thus, one might expect to see a negative coefficient for developing countries.

Finally, we also control for non-concessional IMF loans (IMF LOANS), which are 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.

Trade liberalization is also potentially affected in a profound way by important industry level effects within each country. Such effects might include employment and wage levels, value-added, profit conditions, and associated lobbying and political strength. Unfortunately, while there are some of these series available for the particular countries from the World Bank and other sources, there are many missing data. We have therefore made a decision to control for these unobservable influences through combined country-industry fixed effects.¹³ As a sensitivity check, we later include sectoral net imports as a percentage of GDP (NET IMPORTS/GDP) although we will be forced to drop a few countries (including South Africa, which is a heavy user of antidumping).

It will also be important to control for the initial levels of the industry's tariffs in the country. This variable will control for past abilities of the sector to obtain protection from the government. SECTOR_TARIFF is the average sector nominal tariff for the base year (year t-5) for each observation. We also include the square of this variable 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 those same sectors can systematically withstand pressures for liberalization. We also control for the overall trade policy orientation of the country by including TRADE POLICY INDEX. This index is composed of various elements (i.e., taxes on international trade, regulatory barriers, size of trade sector relative to expected, black-market exchange rates, and international market capital controls), some of which should also help measure non-tariff restrictions. This is particularly convenient since we do not have time-varying accessible data on non-tariff barriers for such a sample of developing countries. Notice that this index, ranging from 1 to 10 (10 represents the highest degree of freedom), does include tariffs but not antidumping measures.

A similar index on the quality of the legal system is also included, as institutional quality is

¹³ Bown (2008) used similar variables in his study of determinants of antidumping actions in developing countries. However, his research focused on a smaller set of developing countries and a shorter time frame.

especially important for implementing antidumping procedures. This variable (LEGAL SYSTEM INDEX) ranges from 1 to 10 (10 is the highest quality of legal structure and security of property rights). It is a composite of proxies pertaining to judicial independence, impartiality of courts, protection of intellectual property, military interference in rule of law and the political process, and strength and impartiality of the legal system and popular observance of the law.¹⁴

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 belong to the GATT/WTO for about 98% of the total observations. Similarly, all countries that have available data for the variables used in this study have an antidumping procedure in place.

III. Regression Results

We discuss regression results in four separate sections. The first will analyze all countries. The second will compare the results for “high use” and “low use” of antidumping among the developing countries in our sample. The third section will include a discussion of some sensitivity checks on our results. In the last section, we consider the economic significance of antidumping as a determinant of trade liberalization.

III.A. All Countries

In Table 4, we display the regression output for the combined sample that includes 1,447 total observations for all nations in the sample. Recall that the dependent variable is the sectoral change in MFN tariffs following Finger et al. (1996) as defined in (3) above.

In column 1, we use all variables except for the antidumping controls. All controls are significantly different from zero at least at a 5 percent marginal level, except for IMF LOANS.

¹⁴ See Gwartney and Lawson (2003) for a detailed discussion of the construction of these two indices.

The first set of variables control for national and sectoral trade policies. The coefficient on TRADE POLICY INDEX is positive and significant, which is consistent with a world in which countries with “good” overall trade policies will undertake further liberalization in the future. At the sectoral level, we see evidence that industries with higher initial tariffs tend to liberalize more (since SECTOR TARIFF is positive) but that this relationship falls with higher-and-higher tariff levels (SECTOR TARIFF-SQUARED is negative).¹⁵ This suggests a non-linearity such that sectors with very high average tariff levels may be able to resist pressures to liberalize.

The second set of variables is designed to control for countrywide macroeconomic conditions. The positive coefficient estimate for per capita income (GDP/CAP) suggests that countries starting at higher levels of economic development tend to liberalize more. We see evidence that higher INFLATION is correlated with less trade liberalization so that for the sample as a whole, trade liberalization is not being used as an anti-inflationary policy tool. The coefficient on GROWTH/CAP is negative and significant. The results for CA/GDP suggest that a higher (lower) current account surplus (deficit) may lead to greater subsequent reductions in tariffs. In short, we find evidence that countries with more economic stability, as proxied by lower inflation rates, higher per capita incomes and less international borrowing, tend to undertake more trade liberalization. Nations in the sample with lower economic growth rates in a previous period may be using trade liberalization as a means to improve future economic vitality.

Finally, we see that the coefficient estimate for LEGAL SYSTEM is positive and significantly different from zero. This suggests that, even after controlling for macroeconomic conditions, countries in our sample with overall high quality of legal institutions will tend to liberalize more.

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 the number of

¹⁵ There may be some concern about a potential bias in the estimates since SECTOR TARIFF and SECTOR TARIFF-SQUARED are lagged functions of the dependent variable and we are using fixed effects. We ran the regressions without these two explanatory variables and obtained qualitatively similar results.

antidumping initiations and the second is count of final duties imposed. Recall that typically 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 realized protection under the system that might be important to tariff reduction. These two measures of course are highly correlated (approximately 75 percent) so they cannot be used simultaneously in any of the regressions.

Columns 2 and 3 of Table 4 include the results when the countrywide totals of antidumping initiations and measures are included, respectively. We see evidence that both measure of antidumping usage are negatively correlated with trade liberalization for these 23 developing countries. In other words, there is no evidence in these regressions that antidumping use has helped these governments lower future tariff rates for the sample as a whole.¹⁶ The coefficient estimates for other explanatory variables are qualitatively identical to those in column 1.

The results for sectoral level use of antidumping are reported in columns 4 and 5. As we saw with countrywide AD use, there is evidence in column 4 that sectoral initiations have had a deleterious impact on later tariff reductions in those same industries. Similar results hold in column 5 for sectoral AD measures.¹⁷ It is important to remember that antidumping duties are not included in the calculation of sectoral MFN tariffs so that an increase in AD duties is not reflected in our dependent variable.

Columns 6 and 7 include both country and sectoral measures of antidumping use in the same regressions.¹⁸ These results suggest that countrywide totals of antidumping usage have more effect on trade liberalization outcomes than the sectoral measures. In column 6, the coefficient for countrywide

¹⁶ In regressions not reported here, we used antidumping counts for year t-6 alone and for five-year totals and the results mirror those in Table 4.

¹⁷ Identical signs and similar marginal statistical significance resulted when we ran the same regressions for the one year and five-year total sectoral AD usage.

¹⁸ There might be some concern about high correlations between these two measures. In fact, the country- and sectoral-level initiation variables have a correlation of only 31% compared to 36% for the measures variable.

AD initiations are estimated more precisely than the sectoral counterparts. In addition, the point estimate for the former is twice as large as the latter. This pattern is similar in column 7 for measures variables. Taken together, these results are consistent with an interpretation that access to antidumping in the country as a whole has more negative effects on industry-level trade liberalization than its use in specific sectors.¹⁹

Overall, we do not find any evidence that antidumping helps the ongoing process of trade liberalization – i.e., no “safety valve” role. If anything, the negative correlation between antidumping use and subsequent reductions in applied tariffs may signal that industries that gain access to the antidumping process are those that can successfully lobby for smaller tariff reductions. This possibility suggests the need for future research into the political economy of antidumping in developing countries.

III. B. High Antidumping vs. Low Antidumping Use Developing Countries

There are important differences in antidumping use among the developing countries in the sample. Table 1 showed that nations in the sample include countries that rarely have used antidumping (e.g., Chile) as well as some that have become frequent users of the procedure (e.g., India). We have consequently split the sample into those that are “high” and “low” users of antidumping. “High” antidumping users are countries in which the total initiations are greater than the sample mean of AD initiations among developing countries. The frequent users include: Argentina, Brazil, China, India, Mexico, Peru, South Africa, and Turkey. The total number of observations for this sample is 493. The “low” users include the balance of the developing country sample and involve 954 individual changes in sectoral tariffs.

Table 5 shows that both sets of countries have a negative correlation between antidumping use and trade liberalization. All of the coefficient estimates, except for one, for the antidumping variables are negative in both samples. In all specifications, the countrywide measures of antidumping (both

¹⁹ The same qualitative results hold if only the antidumping regressors are included, although the extra controls are important in explaining tariff changes, as indicated by the reduced R^2 when they are not included.

initiations and final measures) are significantly different from zero at a 1 percent level. The point estimate for the low users' antidumping use tends to be higher than for those countries that use antidumping more intensively. For example, the coefficient estimate for AD MEASURES (country) for low users (-2.739) is many times larger than for high users (-0.125). This might reflect a diminishing marginal negative effect on trade liberalization as antidumping use becomes more common.

Many of the explanatory variables have the same signs and similar marginal significance levels across subsamples. However, there are some important differences. We see that GROWTH/CAP has little explanatory power for high-use antidumping countries but its coefficient is negative and significant at a 1 percent level for the low-use antidumping nations. Similarly, INFLATION is significant for the latter and not the former.

III. C. Sensitivity Analysis

We report the results of various sensitivity checks in Table 6. In columns 1 and 2, we include the value of net imports (imports minus exports) of the three-digit ISIC sector as a percentage of country GDP (NET IMPORTS)/GDP).²⁰ The advantage to this variable is that it captures the international exposure to competition of the particular sector. Secondly, unlike the country-industry fixed effects, this variable varies over time. The disadvantage is that its inclusion reduces the number of observations and results in some countries' (most notably South Africa, which is a heavy user of antidumping) absence from the data set. As expected, the coefficient on (NET IMPORTS)/GDP is negative but it is statistically different from zero at a 10 percent level in only one of the two specifications (column 2). Otherwise, the results from previous specifications basically follow through even though the number of observations falls to 1,236 and the number of countries is reduced to 20.

Columns 3 and 4 include results if we estimate columns 6 and 7 of Table 4 but include separate industry- and country-specific fixed effects instead of country-industry effects. Such specifications leave

²⁰ We thank Alan Fox for providing this information from WITS.

more variance to be explained by the time-varying coefficients (i.e., country-industry fixed effects encompasses separate country and industry fixed effects). Although the overall fit of the models is lower, as shown by the R^2 , the estimates are qualitatively identical to our earlier results.

As a further sensitivity check, we include the square of antidumping use to see whether there is evidence of non-linearities. One might expect for example that the marginal effect of an additional antidumping case would have a different effect in moving from 3 to 4 cases than from 20 to 21. The results in columns 5 and 6 (once again using country-industry fixed effects) show some evidence of non-linearities, although not in a systematic way.

So far we have used lagged values for our antidumping regressors in order to control for possible endogeneity problems. A different solution would be to use an instrumental variable (IV) approach. It is inherently difficult to find a single good instrument since the antidumping regressors that we employ are quite different (i.e., country versus industry level; initiations versus measures) across specifications. At the same time, the literature (e.g., Knetter and Prusa, 2003; Feinberg, 2005) has consistently shown that country level antidumping initiations respond to the macroeconomic conditions of the filing country (i.e., the number of initiations increases during recessions and when the domestic currency is appreciating). In our case, the growth rate of GDP is a good instrument for AD INITIATIONS²¹ while exchange rate fluctuations do not perform well, possibly because many of the countries in our sample have managed exchange rate systems during the sample period (see Reinhart and Rogoff, 2002).²² The IV results using economic growth as an instrument are reported in column 7 and they are very similar to the ones in

²¹ The Kleibergen-Paap LM and Wald underidentification tests are significant at 1% and the Kleibergen-Paap Wald F test for weak instruments has a value of 60.74, which easily passes the rule of thumb that it should be at least 10 for weak identification not to be considered a problem. The Anderson-Rubin and Stock-Wright tests only reject the insignificance of the endogenous regressor with a p-value of 0.07; however, they would present a p-value of 0.04 if we were to exclude the growth of GDP per capita as a regressor and the results would be qualitatively similar (i.e., AD INITIATIONS would present a negative coefficient significant at 5%). In order to maintain comparability, we prefer to keep GROWTH/CAP as a regressor.

²² This instrument performs poorly for aggregate AD measures and industry-level AD variables. This is not surprising since the authorities' decision to impose AD measure should be more 'objective' than an industry decision to file a petition in response to poor macroeconomic performance. As for the industry-level AD regressors, it is clearly difficult to capture their variability with countrywide variables.

column 2 in Table 4 although the point estimate for AD INITIATIONS is slightly smaller (in absolute terms). Although this approach can only be applied to country-level antidumping initiations, the results suggest that our choice of lagged values for antidumping initiations does not suffer from serious endogeneity problem.

We also conducted other sensitivity tests in results not reported here. First, we used the simple percentage change in tariffs as the dependent variable. Second, we excluded the countries involved in the Asian crisis (i.e., Indonesia, Malaysia, Philippines, and Thailand). For both versions, the results were qualitatively unchanged from our earlier results. Finally, we expanded the sample of countries almost two-fold (from 23 to 55) by using industry fixed effects rather than country-industry fixed effects. This change allows us to include countries with available data for only one tariff change (per sector) that would otherwise be dropped with country-industry fixed effects. We also excluded the trade and legal indices (because of data limitations) so that we could analyze South Korea and Taiwan, both of which are heavy users of antidumping as well as a number of countries (e.g. Estonia, Guatemala, and Pakistan) that have not used antidumping frequently. Once again, the qualitative results of this exercise is very similar to those reported in Table 4 in that the antidumping regressors always have a negative and significant coefficient.

In short, we find strong evidence that the estimates of the determinants of trade liberalization in developing countries are invariant across econometric specifications. Most importantly, we find that past antidumping use is consistently negatively correlated with tariff liberalization.

III. D. Economic Significance

We have discussed the statistical significance of antidumping use but have not considered the marginal economic impact of the estimated antidumping effects. The form of the dependent variable means that one must be careful in interpreting the coefficient estimates. The reason is that the marginal effect depends on the initial value of the tariff. Consequently, we will examine the estimated economic impact of one more antidumping case (i.e., initiation or measure) by calculating the implied percentage change in

tariffs from the sample mean for the sectoral tariffs. Suppose that the coefficient estimate is -0.230, as for countrywide antidumping initiations in column 6 of Table 4, and that t_o and t_l are the pre- and post-liberalization tariff rates, respectively (where a 0.10 ad valorem tariff rate is written as 10). Then, we have

$$\left[\frac{t_1 - t_0}{(100 + t_0)} \right] \cdot 100 = -0.230 \cdot AD \text{ INITIATIONS}$$

that can be translated into a percentage change using the following formula:

$$\left[\frac{t_1 - t_0}{t_0} \right] \cdot 100 = \frac{0.230 \cdot (100 + t_0)}{t_0}$$

Table 7 includes the marginal effects, evaluated at appropriate means of initial tariffs for the different subsamples. The point estimate of -0.230 for countrywide antidumping initiations in column 6 of Table 4 suggests that one more antidumping petition would result in a 1.22 percentage increase in sectoral tariffs. For imposed antidumping measures, the coefficient estimate of -0.181 translates into an increase of 0.96 percent in sectoral tariffs.²³ These calculations suggest that the economic impact of a single additional antidumping action may be relatively small, even if the coefficient estimates are significantly different from zero. However, it is important to remember that many developing countries have experienced a large increase in the number of antidumping cases so that the overall negative affect of antidumping on trade liberalization could be substantial.

Note that the marginal effects on tariff liberalization of an additional antidumping case differs substantially across the high- and low-antidumping use countries. An additional investigation would increase the average sectoral tariffs by 9.02 percent for low-users compared to only 0.88 for high-users. However, the different order of magnitude of these marginal effects must be related to the average antidumping caseload of these two samples. As it can be seen in Table 5, high-use countries imposed on

²³ The marginal effects when using a simple percentage change for the dependent variable would be 1.14 and 1.12, respectively, for antidumping initiations and measures.

average almost 5 measures a year, while low-use countries imposed a measure every three years.

IV. Conclusions

This paper is one of the first to try to ascertain the implications of the rapid increase in antidumping use in developing countries. The specific research question is to evaluate econometrically whether past use of antidumping helps explain subsequent trade liberalization in a group of 23 developing countries. This question is prompted by the frequently noted argument among supporters of antidumping that its use can help relieve protectionist pressure.

We control for macroeconomic conditions, initial tariff levels both at the national and sectoral level, and country-industry 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 over a two-year period prior to tariff changes. We then analyze what factors explain percentage tariff changes in each three-digit ISIC industrial category five years hence.

The initial regression model includes estimates for all countries analyzed together. These regressions indicate that there is evidence that antidumping use is correlated with less trade liberalization. In addition, we see evidence that higher incomes, lower inflation, weaker economic growth, and better institutions are all correlated with greater reductions in tariffs for the sample as a whole. For the whole sample, we see indications that antidumping use has led to less trade liberalization but that this effect is relatively modest, even if statistically significant.

The analysis presented here cannot be extrapolated necessarily to developing countries in general since many poor nations are not in the sample. However, the countries in the sample do represent the lion's share of antidumping use in developing countries over the last two decades. In addition, slightly altered econometric specifications allow us to extend the analysis to a total of 55 developing countries, which results in similar estimates for the relationship between past sectoral antidumping use and future

sector-level tariff reductions.

In short, the results of this study do not support the “safety valve” argument that antidumping, long a part of the multilateral trading system, has contributed to governments’ abilities to lower tariffs, at least for the developing countries analyzed. We remain agnostic about whether antidumping might help fend off protectionist pressures in particular countries or in specific industries in the developed or developing world. But the overall picture presented here suggests that antidumping has not been an effective tool in helping nations pursue reduced tariffs at the sectoral level.

References

- Amiti, Mary and Jozef Konings (2007), "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia," *American Economic Review*, 97(5), pp. 1611-38.
- Ancharaz, Vinaye (2003), "Determinants of Trade Policy Reform in Sub-Saharan Africa," *Journal of African Economies*, 12(3), pp. 417-43.
- Bacchetta, Marc and Bijit Bora (2001), "Post-Uruguay Round Market Access Barriers for Industrial Products," Policy Issues in International Trade and Commodities Study Series No. 12, United Nations: Geneva.
- Baruah, Nandana (2007), "An Analysis of Factors Influencing the Anti-dumping Behaviour in India," *World Economy*, 30(7), pp. 1170-91.
- Bown, Chad (2005), "Global Antidumping Database, Version 1.0," World Bank Policy Research Paper No. 3737, October 2005.
- Bown, Chad (2008), "The WTO and Antidumping in Developing Countries," *Economics and Politics*, 20(2), pp. 255-88..
- Bown, Chad and Patricia Tovar (2008), "Trade Liberalization, Antidumping, and Safeguards: Evidence from India's Tariff Reform," mimeo.
- Destler, I.M., (1996), American Trade Politics, Institute for International Economics: Washington D.C.
- Feinberg, Robert (2005), "U.S. Antidumping Enforcement and Macroeconomic Indicators Revisited: Do Petitioners Learn?," *Review of World Economics*, 141(4), pp. 612-22.
- Feinberg, Robert and Kara Reynolds (2007), "Tariff Liberalization and Increased Administrative Protection: Is There a Quid Pro Quo?," *World Economy*, 30(6), pp. 948-61.
- Finger, J. Michael, Merlinda Ingco and Ulrich Reincke (1996), The Uruguay Round: Statistics on Tariff Concessions Given and Received, The World Bank: Washington D.C.
- Finger, J. Michael and Julio J. Nogués (2005) (eds.), Safeguards and Antidumping in Latin American Trade Liberalization: Fighting Fire with Fire, Palgrave: New York.
- Francois, Joseph F. and Will Martin (2003), "Formula Approaches to Market Access Negotiations," *World Economy*, 26(1), pp. 1-28.
- Gwartney, James and Robert Lawson (2003), "The Concept and Measurement of Economic Freedom," *European Journal of Political Economy*, 19(3), pp. 405-30.
- Gwartney, James, Robert Lawson with William Easterly (2006), Economic Freedom of the World: 2006 Annual Report, The Fraser Institute: Vancouver (Canada). Data retrieved from www.freetheworld.com.
- Knetter, Michael M. and Thomas J. Prusa (2003), "Macroeconomic Factors and Antidumping Filings," *Journal of International Economics*, 61(1), pp. 1-18.
- Liu, Meng-Chun (2002), "Determinants of Taiwan's Trade Liberalization: The Case of a Newly

- Industrialized Country,” *World Development*, 30(6), pp. 975-89.
- Mankiw, N. Gregory and Phil L. Swagel (2005), “Antidumping: The Third Rail of Trade Policy,” *Foreign Affairs*, July/August, 84(4), pp. 107-19.
- Miranda, Jorge, Raul. A. Torres and Mario Ruiz (1998), “The International Use of Antidumping: 1987-1997,” *Journal of World Trade*, 32(5), pp. 5-71.
- Moore, Michael O. and Steven Suranovic (1992), “Lobbying vs. Administered Protection: Endogenous Industry Choice and National Welfare,” *Journal of International Economics*, 32(3), pp. 289-303.
- Moore, Michael O. and Steven Suranovic (1994), “Welfare Effects of Introducing Antidumping Procedures in a Trade-Liberalizing Country,” *Journal of Economic Integration*, 9(2), pp. 241-59.
- Moore, Michael O. and Maurizio Zanardi (2007), “Trade Liberalization and Antidumping: Is There a Substitution Effect?,” mimeo.
- Niels, Gunnar and Adriaan ten Kate (2004), “Anti-dumping Protection in a Liberalising Country: Mexico’s Anti-dumping Policy and Practice,” *World Economy*, 27(7), pp. 967-83.
- Niels, Gunnar and Joseph Francois (2006), “Business Cycles, the Exchange Rate, and Demand for Antidumping Protection in Mexico,” *Review of Development Economics*, 10(3), pp. 388-99.
- Prusa, Thomas J. (2001), “On the Spread and Impact of Anti-Dumping,” *Canadian Journal of Economics*, 34(3), pp. 591-611.
- Reinhart, Carmen M. and Kenneth S. Rogoff (2002), “The Modern History of Exchange Rate Arrangements: A Reinterpretation,” NBER working paper 8963.
- Reyes de la Torre, Luz E. and Jorge G. González (2005), “Antidumping and Safeguard Measures in the Political Economy of Liberalization: The Mexican Case,” in Finger, J. Michael and Julio J. Nogués (2005) (eds.), Safeguards and Antidumping in Latin American Trade Liberalization: Fighting Fire with Fire, Palgrave: New York.
- Vandenbussche, Hylke and Maurizio Zanardi (2006), “The Global Chilling Effects of Antidumping Proliferation,” CEPR working paper No. 5597.
- World Bank (2001), Trade and Production (1976 –1999) Database, The World Bank: Washington D.C.
- Zanardi, Maurizio (2006), “Antidumping: A Problem in International Trade,” *European Journal of Political Economy*, 22(3), pp. 591-617.

Table 1: Countries List and Summary Statistics

Countries	Average Initial Tariff Level	Average Final Tariff Level	AD Initiations	AD Measures Imposed	AD Success Rate
<i>Argentina</i>	13.64 (1992)	14.71 (2002)	216	122	56.5%
<i>Bangladesh</i>	118.56 (1989)	21.00 (2004)	0	0	--
<i>Bolivia</i>	9.92 (1993)	9.93 (2003)	0	0	--
<i>Brazil</i>	46.03 (1989)	14.51 (2004)	159	72	45.3%
<i>Chile</i>	10.95 (1992)	6.97 (2002)	16	7	43.8%
<i>China</i>	51.35 (1992)	16.21 (2002)	62	16	25.8%
<i>Colombia</i>	7.98 (1991)	13.70 (2001)	41	21	51.2%
<i>Ecuador</i>	11.37 (1993)	13.45 (2003)	4	2	50.0%
<i>Hungary</i>	15.50 (1991)	11.66 (2002)	0	0	--
<i>India</i>	62.18 (1992)	31.48 (2004)	330	218	66.1%
<i>Indonesia</i>	25.71 (1989)	10.87 (2004)	40	15	37.5%
<i>Malaysia</i>	18.09 (1988)	11.35 (2001)	17	11	64.7%
<i>Mexico</i>	14.59 (1991)	21.17 (2001)	214	103	48.1%
<i>Paraguay</i>	20.05 (1991)	13.94 (2001)	2	1	50.0%
<i>Peru</i>	19.06 (1993)	10.85 (2004)	100	44	44.0%
<i>Philippines</i>	32.31 (1988)	5.25 (2003)	28	14	50.0%
<i>South Africa</i>	14.36 (1988)	10.88 (1998)	178	64	36.0%
<i>Thailand</i>	43.03 (1989)	21.29 (2000)	9	6	66.7%
<i>Trinidad Tobago</i>	21.23 (1991)	10.05 (2001)	8	7	87.5%
<i>Tunisia</i>	30.96 (1990)	29.65 (2003)	0	0	--
<i>Turkey</i>	12.24 (1993)	8.18 (2003)	75	38	50.7%
<i>Uruguay</i>	8.38 (1992)	14.16 (2002)	7	4	57.1%
<i>Venezuela</i>	21.48 (1992)	14.03 (2002)	27	16	59.3%
Average	27.35	14.58			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 years in parenthesis (or shorter for countries that adopted an antidumping law sometimes in between).

Table 2: Industry Classification and Summary Statistics

ISIC Classification (revision 2)	Average $\Delta t_{k,i,t}$	AD Investigations		AD Measures Imposed	
311 Food products	1.47	52	(3.39)	19	(2.43)
312 Food products (others)	3.22	19	(1.24)	5	(0.64)
313 Beverages	1.62	2	(0.13)	0	(0.00)
314 Tobacco	5.64	1	(0.07)	0	(0.00)
321 Textiles	5.17	89	(5.81)	49	(6.27)
322 Wearing apparel except footwear	6.39	32	(2.09)	8	(1.02)
323 Leather products	5.50	1	(0.07)	0	(0.00)
324 Footwear except rubber or plastic	5.36	15	(0.98)	11	(1.41)
331 Wood products except furniture	4.81	4	(0.26)	3	(0.38)
332 Furniture except metal	6.43	0	(0.00)	0	(0.00)
341 Paper and products	3.58	67	(4.37)	30	(3.84)
342 Printing and publishing	2.83	0	(0.00)	0	(0.00)
351 Industrial chemicals	2.79	500	(32.62)	255	(32.65)
352 Other chemicals	4.11	37	(2.41)	21	(2.69)
353 Petroleum refineries	2.67	2	(0.13)	0	(0.00)
354 Miscellaneous petroleum and coal products	3.06	2	(0.13)	2	(0.26)
355 Rubber products	3.91	41	(2.67)	19	(2.43)
356 Plastic products	4.96	20	(1.30)	12	(1.54)
361 Pottery china earthenware	4.59	1	(0.07)	1	(0.13)
362 Glass and products	4.06	31	(2.02)	11	(1.41)
369 Other non-metallic mineral products	4.31	24	(1.57)	17	(2.18)
371 Iron and steel	1.82	298	(19.44)	163	(20.87)
372 Non-ferrous metals	2.41	24	(1.57)	6	(0.77)
381 Fabricated metal products	3.76	73	(4.76)	46	(5.89)
382 Machinery except electrical	3.29	47	(3.07)	13	(1.66)
383 Machinery electric	4.49	67	(4.37)	44	(5.63)
384 Transport equipment	2.90	11	(0.72)	9	(1.15)
385 Professional and scientific equipment	3.74	43	(2.80)	15	(1.92)
390 Other manufactured products	5.38	30	(1.96)	22	(2.82)
Overall	3.94				

Notes: $\Delta t_{k,i,t} = - \left[\frac{t_{k,i,t} - t_{k,i,t-5}}{(100 + t_{k,i,t-5})} \right] \cdot 100$ 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 change of 3-digit ISIC applied MFN tariffs (for years t and t-5) divided by (100+ year t-5 tariff)	World Bank (2001)
Explanatory Variables		
TRADE POLICY INDEX	Index of trade policy for year t-5 (1=most restricted trade regime and 10=open trade regime)	Gwartney et al. (2006)
SECTOR TARIFF	Sector simple average of applied MFN tariff rates in 3-digit ISIC sector (for year t-5)	World Bank (2001)
SECTOR TARIFF-SQUARED	Square of SECTOR TARIFF	World Bank (2001)
GDP/CAP	Real GDP per capita: three year average (for years t-5, t-6, and t-7)	World Development Indicators (WDI)
INFLATION	Percentage change of GDP deflator (or consumer price index if unavailable): three year average (or consumer prices) (for years t-5, t-6, and t-7)	WDI
GROWTH/CAP	Growth of real GDP per capita: three year average (for years t-5, t-6, and t-7)	WDI
CA/GDP	Current account as a percentage of GDP: three year average (for years t-5, t-6, and t-7)	WDI
LEGAL SYSTEM INDEX	Index of legal system. (1=poor legal and property rights enforcement and 10=high protection of such rights)	Gwartney et al. (2006)
IMF LOANS	IMF non-concessionary loans as a percentage of GDP: three year average (for years t-5, t-6, and t-7)	WDI
NET IMPORTS/GDP	Sectoral net imports (imports-exports) as a percentage of GDP	WITS
AD INITIATIONS (country)	Country's total initiated antidumping investigation: three year totals (for years t-6, and t-7)	Government sources and Bown (2005)
AD MEASURES (country)	Country's total imposed antidumping measures (duties or price undertakings: three year totals (for years t-6, and t-7)	Government sources and Bown (2005)
AD INITIATIONS (sector)	3-digit ISIC sectoral initiated antidumping investigation for a particular country: three year totals (for years t-6, and t-7)	Government sources and Bown (2005)
AD MEASURES (sector)	3-digit ISIC sectoral antidumping measures for a particular country: three year totals (for years t-6, and t-7)	Government sources and Bown (2005)

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

Table 4: All Countries

Dependent variable: Sectoral Tariff Reduction	Mean (Std. Dev.)	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
TRADE POLICY INDEX	6.10 (1.30)	1.455*** (0.369)	2.757*** (0.394)	2.192*** (0.365)	1.561*** (0.347)	1.531*** (0.346)	2.757*** (0.394)	2.192*** (0.365)
SECTOR TARIFF	23.29 (24.56)	0.535*** (0.051)	0.520*** (0.040)	0.534*** (0.041)	0.531*** (0.042)	0.534*** (0.043)	0.519*** (0.040)	0.534*** (0.041)
SECTOR TARIFF-SQUARED	1,145.27 (3,807.89)	-0.001** (0.0004)	-0.001** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001** (0.0003)	-0.001*** (0.0003)
GDP/CAP	2,795.84 (2,018.74)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0005)
INFLATION	84.21 (275.90)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
GROWTH/CAP	2.51 (2.98)	-0.362*** (0.114)	-0.701*** (0.098)	-0.461*** (0.107)	-0.390*** (0.112)	-0.373*** (0.113)	-0.701*** (0.098)	-0.461*** (0.107)
CA/GDP	-1.14 (3.26)	0.715*** (0.164)	0.686*** (0.155)	0.733*** (0.162)	0.713*** (0.164)	0.717*** (0.164)	0.686*** (0.155)	0.733*** (0.162)
LEGAL SYSTEM INDEX	4.90 (1.17)	5.244*** (0.579)	5.636*** (0.557)	5.173*** (0.550)	5.277*** (0.552)	5.238*** (0.552)	5.636*** (0.557)	5.173*** (0.550)
IMF LOANS	0.18 (1.69)	-0.077 (0.099)	-0.014 (0.080)	-0.183 (0.023)	-0.072 (0.082)	-0.063 (0.083)	-0.014 (0.080)	0.060 (0.082)
AD INITIATIONS (country)	5.83 (11.58)		-0.234*** (0.021)				-0.230*** (0.021)	
AD MEASURES (country)	3.83 (9.66)			-0.183*** (0.023)				-0.181*** (0.024)
AD INITIATIONS (sector)	0.20 (1.27)				-0.553*** (0.121)		-0.120 (0.095)	
AD MEASURES (sector)	0.13 (0.92)					-0.579*** (0.193)		-0.071 (0.215)
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)
R-squared		0.81	0.83	0.82	0.81	0.81	0.83	0.82
Observations		1,447	1,447	1,447	1,447	1,447	1,447	1,447

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; all variables are lagged to the base year used in the calculation of the tariff reduction.

Table 5: High AD Use and Low AD Use Developing Countries

Dependent variable: Sectoral Tariff Reduction	High AD Use Developing			Low AD Use Developing		
	Mean (Std. Dev.)	Column 1	Column 2	Mean (Std. Dev.)	Column 3	Column 4
TRADE POLICY INDEX	5.79 (1.25)	1.585*** (0.583)	0.926* (0.529)	6.25 (1.30)	5.198*** (0.840)	5.524*** (0.867)
SECTOR TARIFF	23.15 (20.22)	0.896*** (0.084)	0.887*** (0.089)	23.37 (26.53)	0.433*** (0.033)	0.416*** (0.035)
SECTOR TARIFF-SQUARED	944.12 (2,304.59)	-0.002*** (0.0003)	-0.002*** (0.0003)	1,249.23 (4,384.90)	-0.0004 (0.0003)	-0.0003 (0.0003)
GDP/CAP	3,346.94 (2,335.21)	0.004*** (0.001)	0.002*** (0.001)	2,511.05 (1,769.16)	0.010*** (0.002)	0.007*** (0.001)
INFLATION	214.43 (444.15)	0.002 (0.001)	-0.001 (0.001)	16.91 (18.63)	0.231*** (0.045)	0.154*** (0.029)
GROWTH/CAP	2.36 (2.91)	0.051 (0.351)	0.026 (0.342)	2.58 (3.01)	-0.553*** (0.106)	-0.601*** (0.107)
CA/GDP	-1.08 (2.56)	-0.797** (0.396)	0.121 (0.382)	-1.17 (3.58)	1.411*** (0.258)	1.167*** (0.198)
LEGAL SYSTEM INDEX	5.14 (0.75)	5.683*** (0.777)	3.911*** (0.590)	4.77 (1.32)	6.044*** (0.645)	6.669*** (0.710)
IMF LOANS	0.29 (0.87)	2.748*** (0.758)	2.102*** (0.721)	0.12 (1.97)	1.024*** (0.252)	0.854*** (0.207)
AD INITIATIONS (country)	14.94 (15.98)	-0.164*** (0.024)		1.88 (3.92)	-1.709*** (0.359)	
AD MEASURES (country)	10.24 (14.44)		-0.125*** (0.027)	1.03 (2.70)		-2.739*** (0.544)
AD INITIATIONS (sector)	0.52 (2.08)	-0.063 (0.043)		0.07 (0.53)	-0.462** (0.205)	
AD MEASURES (sectors)	0.35 (1.52)		0.014 (0.071)	0.04 (0.46)		-0.540* (0.290)
Country-Industry Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)		Y (0.00)	Y (0.00)
R-squared		0.96	0.96		0.82	0.83
Observations		493	493		954	954

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; all variables are lagged to the base year used in the calculation of the tariff reduction. “High AD Use Developing” countries include: Argentina, Brazil, China, India, Mexico, Peru, South Africa, and Turkey.

Table 6: Sensitivity Results

Dependent variable: Sectoral Tariff Reduction	Mean (Std. Dev.)	Column 1	Column 2	Mean (Std. Dev.)	Column 3	Column 4	Column 5	Column 6	Column 7
TRADE POLICY INDEX	6.30 (1.12)	1.404*** (0.200)	0.979*** (0.198)	6.10 (1.30)	1.694*** (0.431)	1.069*** (0.412)	2.778*** (0.405)	2.553*** (0.405)	2.492*** (0.547)
SECTOR TARIFF	20.22 (16.28)	0.664*** (0.033)	0.689*** (0.033)	23.29 (24.56)	0.353*** (0.035)	0.361*** (0.035)	0.517*** (0.043)	0.489*** (0.042)	0.523*** (0.046)
SECTOR TARIFF-SQUARED	673.79 (1,627.46)	-0.002*** (0.0003)	-0.002*** (0.0003)	1,145.27 (3,807.89)	-0.0003 (0.0002)	-0.0004* (0.0002)	-0.001** (0.0004)	-0.001** (0.0003)	-0.001** (0.0004)
GDP/CAP	2,841.08 (2,030.14)	0.002*** (0.0003)	0.002*** (0.0003)	2,795.84 (2,018.74)	0.004*** (0.0004)	0.004*** (0.0004)	0.004*** (0.0005)	0.004*** (0.0005)	0.004*** (0.0004)
INFLATION	96.12 (296.85)	-0.002*** (0.0003)	-0.002*** (0.0003)	84.21 (275.90)	-0.006*** (0.001)	-0.007*** (0.001)	-0.004*** (0.001)	-0.006*** (0.001)	-0.004*** (0.001)
GROWTH/CAP	2.89 (2.84)	-0.778*** (0.086)	-0.711*** (0.088)	2.51 (2.98)	-0.792*** (0.103)	-0.545*** (0.104)	-0.718*** (0.103)	-0.602*** (0.097)	-0.632*** (0.201)
CA/GDP	-1.30 (3.36)	0.079 (0.065)	0.027 (0.065)	-1.14 (3.26)	0.684*** (0.116)	0.734*** (0.120)	0.680*** (0.149)	0.719*** (0.153)	0.692*** (0.162)
LEGAL SYSTEM INDEX	4.90 (1.07)	2.517*** (0.319)	2.289*** (0.344)	4.90 (1.17)	5.868*** (0.415)	5.411*** (0.413)	5.666*** (0.577)	5.584*** (0.571)	5.556*** (0.500)
IMF LOANS	0.21 (1.76)	0.010 (0.067)	0.019 (0.071)	0.18 (1.69)	-0.142 (0.109)	-0.074 (0.112)	-0.009 (0.084)	0.065 (0.080)	-0.027 (0.095)
NET IMPORTS/GDP	0.02 (0.13)	-3.033 (2.143)	-4.367* (2.300)						
AD INITIATIONS (country)	6.40 (12.17)	-0.178*** (0.014)		9.98 (18.99)	-0.238*** (0.021)		-0.272*** (0.082)		-0.186** (0.096)
(AD INITIATIONS)-SQUARED (country)				459.89 (1,466.71)			0.001 (0.002)		
AD MEASURES (country)	4.46 (10.32)		-0.145*** (0.014)	5.69 (12.46)		-0.182*** (0.025)		-0.738*** (0.107)	
(AD MEASURES)-SQUARED (country)				187.55 (588.86)				0.014*** (0.002)	
AD INITIATIONS (sector)	0.22 (1.35)	-0.093* (0.052)		0.34 (2.14)	-0.004 (0.088)				
AD MEASURES (sector)	0.15 (0.99)		-0.064 (0.103)	0.20 (1.31)		0.027 (0.161)			
Separate Industry and Country Fixed Effects (Prob>F)					Y (0.00) Y (0.00)	Y (0.00) Y (0.00)			
Country-Industry Fixed Effects (Prob > F)		Y (0.00)	Y (0.00)				Y (0.00)	Y (0.00)	Y (0.00)
R-squared		0.88	0.87		0.73	0.72	0.83	0.83	0.70
Observations		1,236	1,236		1,447	1,447	1,447	1,447	1,447

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; all variables are lagged to the base year used in the calculation of the tariff reduction; the specifications in columns 3 and 4 include separate country and industry fixed effects; in the specification of column 7 AD INITIATIONS is instrumented with the growth rate of real GDP (over three years); as for the instrument, the Kleibergen-Paap LM and Wald underidentification tests are significant at 1%, the Kleibergen-Paap Wald F test for weak instruments has a value of 60.74. The Anderson-Rubin and Stock-Wright tests only reject the insignificance of the endogenous regressor with a p-value of 0.07.

Table 7: Economic Significance (Marginal AD Use Effects on Sectoral Tariffs)

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	All countries (Table 4, Column 6)	All countries (Table 4, Column 7)	High-AD Use Countries (Table 5, Column 1)	High-AD Use Countries (Table 5, Column 2)	Low-AD Use Countries (Table 5, Column 3)	Low-AD Use Countries (Table 5, Column 4)
AD INITIATIONS (country)	1.22***		0.88***		9.02***	
AD MEASURES (country)		0.96***		0.67***		14.46***
AD INITIATIONS (sector)	0.64		0.34		2.44**	
AD MEASURES (sector)		0.38		0.08		2.85*

Notes: Marginal effects report the percentage change in sectoral tariff due to one AD case calculated as $\frac{(100+t) \cdot b}{t}$ where t is the average tariff rate and b is the estimated coefficient for the specification used in each column; ***, **, and * denote significance at 1, 5, and 10 percent, respectively.