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From Agreement to Application

A Cross Country Analysis of Injury Determinants under the WTO Antidumping Agreement

by

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From Agreement to Application*

A Cross Country Analysis of Injury Determinants under the WTO Antidumping Agreement

Kara M. Reynolds**

Abstract

Although the World Trade Organization's (WTO) Antidumping Agreement includes rules that govern the application of antidumping duties, countries still have a great deal of latitude in how they decide whether to impose this form of protection. This research is one of the first papers to explore country and industry specific differences in the determinants of antidumping injury decisions. Using a random-coefficients probit model, I estimate the amount of variance in the marginal impact of particular characteristics on the probability of an affirmative injury determination. I investigate to what extent this variance can be explained by specific characteristics of the investigating country. The results indicate that there is a great deal of inconsistency in injury decisions under the current WTO Antidumping Agreement.

Key words: Antidumping, World Trade Organization, Random-Coefficients

JEL classification: F13

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1 Introduction

The 1994 General Agreement on Tariffs and Trade (GATT) ushered forth a new era in global trade relations. Among other notable achievements, the Agreement established the World Trade Organization (WT0), strengthened dispute settlement provisions, significantly reduced tariffs and export subsidies, and provided for the gradual elimination of import quotas. Although many forms of trade protection have fallen under the 1994 Agreement, antidumping protection has proven to be a noteworthy exception. Thirty-one countries imposed antidumping protection a total of 757 times in the five years following implementation of the 1994 agreement, an 82.4 percent increase in the number of imposing countries and a 43.6 percent increase in the number of antidumping measures imposed compared to the previous five years.[1]

Under the WTO Antidumping Agreement (the Agreement), countries may protect their domestic industries by imposing additional imports duties on specific products if the country finds these products have been dumped, or sold below a "normal" value.[2] Before imposing antidumping duties, the country must undertake an investigation to (1) prove that dumping is taking place and calculate the extent of this dumping and (2) prove that the dumping is causing or threatening to cause "material injury" to the domestic industry.

Although the Agreement specifies a number of rules that must be adhered to during the course of antidumping investigations, countries still have a great deal of latitude in how they decide whether the dumping is causing material injury to the domestic industry. The Agreement specifies only that countries must consider all "relevant economic factors." The increasing number of trade disputes that have arisen over antidumping duties suggests that either the Agreement is not applied consistently across countries or countries are interpreting

[1]The number of antidumping investigations actually decreased in the five years following the agreement, falling 3.2 percent to 1,198 investigations. Based on these statistics, antidumping investigations appear to be more likely to result in protection following the 1994 Antidumping Agreement. For more detailed statistical information, see Zanardi (2004).

[2]The normal value is typically defined as the price set by the foreign producer in its domestic market, although the agreement allows countries to exclude any prices made below the producer's average cost of production in this calculation of normal value. Thus, antidumping regulations target both predatory pricing and price discrimination.

the rules within the Agreement quite differently. Of the 334 disputes initiated at the WTO between 1995 and 2005, nearly 17 percent involved antidumping investigations. WTO members have agreed to consider refinements to the Antidumping Agreement during the Doha Round of trade negotiations, specifically to "clarify and improve...while preserving the basic, concepts and principles of these agreements."[3]

This research is one of the first papers to explore country and industry specific differences in the determinants of antidumping injury decisions. Using a random-coefficients probit model, I estimate the amount of variance in the marginal effects of particular economic and political characteristics on the probability of an affirmative determination across both countries and industries. I also investigate to what extent differences can be explained by specific characteristics of the investigating country, particularly the country's level of development. The results indicate that there is a great deal of inconsistency in injury decisions under the current WTO Antidumping Agreement. Countries appear to utilize a wide variety of economic characteristics to make their injury determinations. For example, the results suggest that the total volume of imports from the country under investigation has a positive and significant impact on injury determination in high-income countries but not in developing countries. Similarly, it appears that the determinations of some countries are more influenced by political factors then others.

The remainder of this paper is structured as follows. Section [2] provides a description of the WTO's antidumping agreement, particularly the provisions regulating how countries must determine whether dumping has caused material injury to their domestic industries. It then reviews the literature studying the economic and political determinants of injury decisions in various countries. Section [3] describes the empirical methodology, and Section [4] discusses the data used in this research. The final two sections of the paper present the empirical results and conclusions of the research.

2 Injury Determinations and the WTO

This section reviews both the history of the WTO Antidumping Agreement and previous economic research on the outcome of antidumping investigations in an effort to motivate the

[3] 2001 Doha Ministerial Declaration.

empirical specification and variables used in this study. Because this research compares injury determinations under the WTO Antidumping Agreement across countries, the discussion below focuses specifically on those aspects of the Antidumping Agreement which deal with the determination of injury.

2.1 The Antidumping Agreement

Antidumping has a long history in the GATT, going back to the original GATT Agreement of 1947. At that time, the GATT allowed countries to impose antidumping duties as long as the country determined that the dumping was causing or threatening to cause material injury to a domestic industry. Few countries used antidumping protection during these earlier years, in part because tariff levels were generally high enough to protect domestic industries.[4] As tariff rates gradually decreased in the years following World War II, countries slowly began to impose more antidumping protection. This increase in use led to the completion of the first Antidumping Agreement in 1967 as part of the Kennedy Round of trade negotiations.

The Kennedy Round Antidumping Agreement required countries to demonstrate that dumped imports were the *principal* cause of injury to the domestic industry prior to the imposition of duties. It emphasized that countries must consider all other factors which may be adversely affecting the industry. The agreement was significantly revised in 1979 under the the Tokyo Round of trade negotiations. Since that time injury determinations must be based on (1) the volume of dumped imports, (2) the impact of these imports on prices in the domestic market, and (3) the impact of these imports on domestic producers. The Uruguay Round did not significantly change the injury determination clauses of the Antidumping Agreement, thus most of the regulations discussed below have been in place since 1979.

Under the Antidumping Agreement, investigating authorities must consider whether there has been a significant increase in dumped imports, price undercutting of the domestic industry, and whether the imports either depress domestic prices or prevent price increases.

[4] The first countries to use antidumping protection include Australia, Canada, the European Union, New Zealand and the United States. However, use of antidumping laws was limited in the early years even in these countries.

Investigating authorities should consider a wide range of economic factors including actual and potential decline in sales, profits, output, market share, productivity, capacity utilization and investments. Other economic factors that should be considered include cash flow, inventories, employment, wages, and growth. The authorities are directed to consider other factors that may be causing injury to the domestic industry other than dumped imports. Note that it is not enough to show that the domestic industry has been injured; the government must prove a causal link between the dumped imports and the injury or threat of injury. The Agreement requires that the investigation be terminated if officials determine that the volume of either actual or potential dumped imports is "negligible."[5]

The only significant change made to the injury provisions of the Antidumping Agreement during the Uruguay Round was the inclusion of cumulation procedures. When the investigating authority is considering the impact of imports from more than one country simultaneously, the Agreement allows officials to cumulatively assess the effects as long as this cumulation is appropriate under the conditions of competition between the imported products and the domestic producers. Such cumulation procedures had been part of both the U.S. and EU antidumping regulations prior to inclusion in the Antidumping Agreement.

Note that although the injury provisions of the Antidumping Agreement did not change significantly under the Uruguay Round, the Uruguay Round did usher in major changes in other aspects of antidumping regulations. For example, prior to the Uruguay Round antidumping duties were imposed indefinitely. Since 1994, countries have agreed to review the imposition of antidumping duties every five years. The Uruguay Round also limited the use of adverse facts in dumping margin determinations. Any or none of these changes could have spurred the increase in antidumping protection since passage of the Uruguay Round. Countries may be imposing more antidumping protection simply because other forms of protection have gradually decreased under the Uruguay Round.

All signatories to the Antidumping Agreement have obviously agreed to adhere to the above rules. However, implementation of these rules differs significantly across countries. For example, while countries like the European Union and Australia rely upon a single agency

[5] The term negligible was undefined until the Uruguay Round, at which time it was defined as less than three percent of imports of the product in the country.

to determine both the dumping and injury determination, others like the United States and Canada assign these decisions to two separate agencies. The degree of transparency in the decision-making process also varies across countries, particularly the amount of economic data released to both participating firms and the public at large.[6] Antidumping regulations in the EU require government officials to consider the impact of duties on end-users of the product under investigation prior to imposing duties; other countries have no such provisions.

2.2 Injury Determinations Under the AD Agreement, 1995-2003

According to WTO statistics, WTO members initiated 2,436 antidumping investigations between 1995 and 2003. These same members imposed antidumping measures in 1,522 investigations during this time period, suggesting that slightly over 60 percent of all antidumping investigations eventually result in the imposition of duties.[7] Although I only include the outcomes of investigations initiated by twelve WTO members in this research, the sample includes a large proportion of total worldwide antidumping activity.[8] The twelve selected countries initiated 1,861 investigations between 1995 and 2003, or slightly over three-quarters of the total number of investigations by WTO members. These same twelve countries imposed 1,160 antidumping measures during this time period, suggesting that countries within the sample are equally likely to impose antidumping duties following their investigations as all WTO members.

Government officials made final injury determinations in 1,673 of the 1,861 investigations initiated by countries in the sample.[9] Government officials made affirmative determinations in 68.9 percent of these injury investigations, finding that dumped imports from the country under investigations were causing or threatening to cause material injury to the domestic

[6] Blonigen and Prusa (2003).

[7] Antidumping investigations typically take longer than one year; it is unlikely that all 2,436 investigations initiated between 1995 and 2003 resulted in determinations during this same time period.

[8] The sample includes Argentina, Australia, Brazil, Canada, China, the European Union, India, Korea, Mexico, New Zealand, Peru, and the United States.

[9] Note that this figure includes the negative injury determinations made in preliminary stages of investigations that resulted in termination of investigations. Final injury determinations were unavailable for those investigations that were withdrawn by the industry or terminated for reasons other than a negative injury determination.

industry.

This average outcome of injury determinations masks a great deal of heterogeneity in the outcome of injury investigations across both countries and industries. As illustrated in Figure [1], the percentage of investigations resulting in affirmative injury determinations varies significantly across countries, ranging from a high of 87.6 percent in China to a low of 35.8 percent in Australia. Similarly, the likelihood of an affirmative injury determination appears to depend a great deal on the industry under investigation, as revealed in Table [1]. For example, while all of the antidumping investigations involving six of the industries in the sample resulted in affirmative injury determinations, none of the 24 investigations involving the apparel sector resulted in an affirmative injury determination.[10]

2.3 Literature Review

Research on the determinants of antidumping investigation outcomes has exploded with the level of antidumping protection in the world. Much of this research tests the theoretical predictions of political economy models of trade policy by investigating to what degree political factors influence government determinations during antidumping investigations. Although a complete review of this literature is out of the scope of this paper, below is a brief summary of the key results of earlier research, including a comparison of results across countries.[11]

Finger, Hall and Nelson (1982) provides the first empirical evidence of the economic determinants of antidumping investigation outcomes. The authors hypothesize that injury determinations are more likely to be influenced by political factors than the dumping margin determinations because while regulations governing dumping margin determinations specify the methodologies that should be used to make these calculations, regulations are less specific as to how injury determinations should be made. Using a sample of outcomes from nearly 300 investigations between 1980 through 1987 in the United States, the authors find some evidence to support this conclusion. Specifically, such characteristics as the size of the

[10] An industry is defined by its three digit International Standard Industrial Classification (ISIC) Rev. 2 number.

[11] Both Nelson (forthcoming) and Blonigen and Prusa (2003) provide detailed overviews of the current state of research on antidumping.

industry (as measured by total employment) significantly impact the injury determination but not the dumping margin determination.

Most research on this topic since Finger, Hall and Nelson (1982) utilize similar techniques to study the influence of political factors on antidumping injury determinations. Typically researchers in this field estimate a probit regression in which the dependent variable equals one if the government makes an affirmative injury determination, thus resulting in the imposition of antidumping duties. Although the papers differ in the data and variables used, many reach similar conclusions. For example, virtually all research in this area has found that the economic characteristics of industries significantly influence injury determinations. However, papers that use highly disaggregated data from actual investigation reports such as Moore (1992) and Devault (1993) typically find a stronger correlation between economic characteristics and the injury determination than those that use more aggregated data such as Finger, Hall and Nelson (1982) and Hansen and Prusa (1996, 1997).[12] Economic characteristics that typically prove to be important include the volume of imports and profit or output loss in the domestic industry.

Research on the determinants of injury decisions, including Devault (2001), Hansen (1990) and Sabry (2000), also typically find that political factors, such as the size of the industry and the amount of political monetary contributions made by the industry, can influence determinations. Although all of the paper described above utilize U.S. investigation data, Eymann and Schuknecht (1996) reaches similar conclusions for the European Union. As discovered in such papers as Hansen and Prusa (1996, 1997), political pressure may take the form of bias against certain trading partners. For example, Hansen and Prusa find that U.S. cases against western European countries are more likely to result in negative injury determinations than U.S. cases against Japan and non-market economies such as China.

Other research has found that certain antidumping regulations can have a dramatic impact on investigation outcomes. Hansen and Prusa (1996) investigate the 1985 change in U.S. antidumping law that allowed for the cumulation of imports from all targeted countries

[12] Countries may not release the disaggregated data from some antidumping investigations in order to preserve the confidentiality of the domestic firms taking part in the investigation. As a result, research that uses disaggregated data must rely on a much smaller number of observations.

when making the injury determination. They find that cumulated cases are approximately 30 percent more likely to result in duties than non-cumulated cases. Tharakan, Greenway, and Tharakan (1998) find similar results when investigating the impact of cumulation on European injury decisions. Both papers suggest that the increase in protection following the inclusion of cumulation procedures in antidumping regulations is not just due to the actual law change, but that government agencies actually became more protective following the change in law.

Although not specified in regulations, Feaver and Wilson (1998) argue that the Australian Antidumping Authority makes decisions in a bifurcated approach–first deciding whether the domestic industry has suffered material injury and then whether dumped imports caused said injury. The authors empirically estimate the determinants of only the material injury decision and find that economic factors, including whether there was evidence that domestic prices had been suppressed or whether the industry experienced a decline in capacity utilization, played a much larger role in the material injury decision than suggested by earlier studies of the U.S. and European injury determinations. However, the authors could not reject the hypothesis that there was a protectionist bias in Australian decisions. Devault (1993) similarly models a bifurcated decision-making process in the United States and finds that the two-stage process significantly impacts results. Specifically, by estimating a two-stage decision making process Devault finds that antidumping protection is offered only to those industries with negative profits, not those with lower profits.

As can be seen from the list above, most research on antidumping investigation outcomes specifically studies cases in the United States, although some research has been done on outcomes in the European Union and Australia. In contrast, little research has been done on injury determinations in new users of antidumping, particularly developing countries. Francois and Niels (2004) examines the role that political factors play in Mexico's antidumping determinations. Similar to the studies discussed above involving the United States and European Union, the authors find that political factors such as the size and level of concentration of the industry significantly impact the outcome of antidumping determinations. Mexico is also more likely to impose dumping margins on non-WTO members and countries which have imposed antidumping duties against Mexican firms in the past. Bown (2006) examines the success of antidumping investigations in nine developing countries and finds that countries are more likely to award antidumping protection to larger (as measured by the value of output) and more capital intensive industries.[13] In this study, Bown accounts for country- and industry-specific differences in antidumping petition outcomes using country and industry fixed effects.

With the exception of Bown (2006), all of the research above studies antidumping investigation outcomes from the perspective of a single country. In contrast, Tharakan and Waelbroeck (1994) argues that although the EU and U.S. system are similar, differences in regulations and procedures make the EU system more susceptible than the United States to political influences. Specifically, the EU limits the antidumping duty to the level that would eliminate the injury to the domestic industry, rather than the full dumping margin, which places more emphasis on the injury determination. They also argue that the methods used by the EU to make determinations were less sophisticated than those used by the United States, and that the lack of transparency of the EU system makes affirmative injury determinations more likely.[14] Tharakan and Waelbroeck (1994) replicate a model similar to Finger, Hall, and Nelson (1982), then compare the results to the original U.S. research to compare outcomes in the two countries. The authors conclude that political factors are important determinants of injury decisions in the European Union like in the United States, although there are differences in the particular variables that prove significant in the outcomes in the two country's antidumping regimes.

3 Empirical Specification

This research builds upon work by Bown (2006) and Tharakan and Waelbroeck (1994) by exploring cross-country differences in the determinants of antidumping injury decisions. This section describes a model of decision-making in antidumping injury investigations that allows the determinants of the decisions to vary across both countries and industries.

[13]Bown (2006) hypothesizes that capital-intensive industries tend to have higher fixed costs and, thus, are more likely to face cyclical dumping than other industries.

[14]Specifically, the EU fails to release business confidential information to the foreign defendants in the antidumping investigation.

Officials in country c must decide whether or not to make an affirmative injury determination in each of the P antidumping investigations initiated by industry i between 1995 and 2003. Although all countries must abide by the WTO Antidumping Agreement, each country interprets the WTO regulations differently. Officials within the country also abide by idiosyncratic domestic regulations. As illustrated in Table [1], the proportion of investigations in which officials make affirmative injury determinations differs significantly across industries. It is unclear whether this difference is due to differences in the characteristics of the industry themselves or differences in the way that government officials interpret these characteristics. Therefore, I allow the parameters describing the determinants of the injury decision to differ across both countries and industries.[15]

Define y^*_{cip} as the propensity of officials in country c to make an affirmative injury determination in petition p filed by industry i. As in a typical probit model, officials make an affirmative injury determination when this propensity is greater than zero, and a negative determination otherwise. Mathematically, the injury determination can be expressed as:

$$y^*_{cip} = x_{cip}\beta + z_{cip}\gamma_{ci} + u_{cip},\ u_{cip} \sim N(0,1)$$

$$y_{cip} = 1[y^*_{cip} > 0]$$

$$\gamma_{ci} = \gamma + \Delta w_{ci} + \Gamma v_{ci}.$$

The dependent variable y_{cip} equals one when officials make an affirmative injury determination and zero otherwise. The propensity to make an affirmative determination is a function of a miriad of characteristics included in the vectors x_{cip} and z_{cip}. Officials in all countries are assumed to place the same weight, β on the factors included in x_{cip}. However, the impact of the factors included in z_{cip} on the final injury determination, γ_{ci}, are random and will depend on both the country and industry filing the antidumping petition. As indicated in the expression above, the value of the random parameters will depend on a number of factors, including: γ, a K_1 by one vector of the average impact of z_{cip} on the propensity to make an affirmative determination, where K_1 is the number of variables in z_{cip}; Δ, a K_1 by K_2 matrix

[15] I also need to make this assumption to empirically estimate the model. Observations are defined as groups with the same parameters. By allowing parameters to vary across both countries and industries, I increase my sample size to 166 country-industry combinations compared to just 12 countries.

of parameters that describe the impact of the K_2 observed characteristics of industry i and country c, w_{ci}, on the random parameters; v_{ci}, a K_1 by one vector of mean zero random variables; and Γ, a K_1 by K_1 lower triangular matrix of parameters. Specifically, Γ is the Cholesky factorization of the covariance matrix of the random parameters.[16]

The determinants of antidumping injury decisions can be estimated using a random-coefficients bivariate probit model.[17] Using this specification, the conditional probability of observing the country making a particular injury determination in the p^{th} petition filed by industry i is:

$$Prob(y_{cip}|\gamma_{ci}) = \int_{\gamma_{ci}} [\Phi(x_{cip}\beta + z_{cip}\gamma_{ci})]^{y_{cip}}[1 - \Phi(x_{cip}\beta + z_{cip}\gamma_{ci})]^{(1-y_{cip})} f(\gamma_{ci}|\gamma, \Delta, \Gamma, w_{ci})\partial\gamma_{ci}$$

where Φ is the standard normal distribution. The likelihood contribution of the individual country/industry is the product of this conditional probability over the P petitions filed by industry i in country c, while the likelihood function associated with the full sample is the product of the likelihood contributions of each country and industry in the sample:

$$L = \Pi_c\Pi_i \int_{\gamma_{ci}} \Pi_p[\Phi(x_{cip}\beta + z_{cip}\gamma_{ci})]^{y_{cip}}[1 - \Phi(x_{cip}\beta + z_{cip}\gamma_{ci})]^{(1-y_{cip})} f(\gamma_{ci}|\gamma, \Delta, \Gamma, w_{ci})\partial\gamma_{ci} \quad (1)$$

Estimation of Equation [1] is not feasible because the integral cannot be calculated analytically. The likelihood contribution of each country/industry combination must instead be approximated using simulation, and the parameters estimated through maximum simulated likelihood. The simulated log likelihood function is defined as:

$$LogL = \sum_c \sum_i Log\frac{1}{R}[\sum_{r=1}^{R} \Pi_p[\Phi(x_{cip}\beta + z_{cip}\gamma_{cir})]^{y_{cip}}[1 - \Phi(x_{cip}\beta + z_{cip}\gamma_{cir})]^{(1-y_{cip})}]$$

$$\gamma_{cir} = \gamma + \Delta w_{ci} + \Gamma v_{cir}$$

where γ_{cir} is the r^{th} draw of γ_{ci} from the underlying distribution of v_{ci}, and R is the total number of simulated draws used in the estimation. In the results presented below, I simulate the integral in Equation [1] using 125 draws from a Halton sequence. Research has shown

[16] In the results presented below, I assume that v_{ci} is normally distributed and that the covariance terms of the random parameters are zero. In other words, I assume that Γ is a diagonal matrix, with the standard deviation of v_{ci} on the diagonal.

[17] This model is sometimes refered to as a multilevel or mixed probit model.

that simulation error with 125 draws from a Halton sequence of values is half as large as with 1000 random draws.[18]

4 Data

The research would not have been possible without the recently completed Global Antidumping Database, which provides detailed data on all of the antidumping investigations undertaken by 19 countries since 1980.[19] The database includes such information as the date of the initiation of the investigation, the date and outcome of the preliminary and final injury and dumping determinations, and the names of both the domestic and foreign firms involved in the investigation.[20]

Ideally, any empirical investigation of the determinants of antidumping injury decisions across countries would include as much of the specific information taken under consideration by the investigating authorities as available, including those factors described in Section [2] for the specific industry under investigation. Researchers studying the determinants of U.S. injury investigations, including Moore (1992), have successfully collected such disaggregated information from the public files associated with U.S. investigations. Unfortunately, the global nature of this dataset, particularly the variation in the public release of information across countries, makes it virtually impossible to collect such disaggregated data for this project.

I instead seek to explain injury decisions in antidumping investigations across indus-

[18] Train (2003), page 231. Specifically, I draw K_1, R by N sequences of Halton values, where N is the total number of industry-country observations. The k^{th} sequence of Halton values is calculated by defining k as k^{th} prime number larger than 2. I expand the value of a sequence of integers in terms of base k as $g = \Sigma_{i=0}^{I} b_i k^i$. The corresponding g^{th} value in the Halton sequence is defined by $H_k(g) = \Sigma_{i=1}^{I} b_i k^{-i-1}$. This sequence is efficiently spread over the unit interval. Based on my assumption that v_{ci} is normally distributed, the k^{th} element of $v_{cir} = \Phi^{-1}(H_k(cir))$, where Φ^{-1} is the inverse of the standard normal distribution.

[19] This database was collected by Chad Bown under a project funded by the World Bank. It is currently available online at http://people.brandeis.edu/~cbown/global_ad/. See Bown (2006) for more information.

[20] I recoded some of the case outcomes from the Global Antidumping Database. For example, the Database codes some investigations terminated due to negligible imports at "terminated." Because the level of imports is a key element in the injury determination, I recode these case outcomes as having a negative injury determination.

tries and countries using the more readily available data at more aggregated levels. To do this, I first assign each investigation to industries using the harmonized system (HS) trade classification numbers of the products under investigation as provided in the Global Antidumping Database. I match each investigation to a five-digit Standardized International Trade Classification (SITC) (Rev. 2) industry using the concordance between HS and SITC classifications developed by Feenstra (1996). Note that the HS numbers associated with a particular investigation may correspond with more than one SITC industry. In this case, I assign the investigation to the SITC industry which accounted for the largest value of imports from the country under investigation in the year of the investigation. Using this SITC classification, I also assign each investigation to a three digit International Standard Industrial Classification (ISIC) (Rev. 2) industry using the concordance developed by the Organization for Economic Cooperation and Development (OECD).

Explanatory variables come from several sources. The probability of an affirmative injury determination should increase with the value of imports of the dumped product from the country under investigation (*Log (Imports)*), as well as the proportion of imports of this product from the country under investigation (*Exporter's Share of Imports*). Intuitively, an increase in either measure should increase the likelihood that the investigating authority will find that the dumped imports were the *principal* cause of injury to the domestic industry. I calculate both measures using data from the United Nation's Commodity Trade Statistics Database, which provides import data at the five digit SITC (Rev. 2) level.

The probability of an affirmative injury determination should be negatively correlated with the domestic industry's annual production growth because high levels of growth are one indicator that the domestic industry has not suffered material injury due to the dumped imports. I calculate the industry's annual (*Production Growth*) using the "Index of Industrial Production" reported at the three-digit ISIC level in the United Nation Industrial

Development Organization's (UNIDO) Industrial Statistics Database.[21,22]

As noted above, earlier studies have found that political factors can play a significant role in injury determinations. I use two alternative measures of the political strength of the industry: the industry's share of the importing country's Gross Domestic Product (GDP) (*Industry's Share of GDP*) and the industry's share of the importing country's total employment (*Industry's Share of Employment*). To calculate these shares, I use the three-digit ISIC industry's value-added and employment from the UNIDO Database. The International Labor Organization's Labor Force Survey provides total employment by country, and I use real GDP data from the International Monetary Fund's International Financial Statistics.[23] If political factors play a significant role in antidumping determinations, I would expect the impact of both variables to be positively correlated with the likelihood of an affirmative injury determination.

Although the import sensitivity of an industry may significantly affect the investigating authority's injury determination, it is unclear whether import sensitive industries are more or less likely to be awarded antidumping protection. Typically, the more sensitive the industry, the more likely it is to be awarded protection. However, if these industries have already been awarded alternative forms of protection such as high protective tariffs then they are less likely to request additional antidumping protection. I hypothesize that conditional on requesting antidumping protection, the likelihood of an affirmative injury determination should be positively correlated with the degree of import sensitivity of the industry because the imports under investigation are more likely to cause material injury to highly sensitive domestic industries. I measure the degree of import sensitivity with the average tariff rate

[21]The UNIDO data reports this index with as much as a two to three year lag. In order to maximize my data sample, I lag the *Production Growth* data by one year. In other words, I assume that the probability of an affirmative injury decision in a case filed in 2000 is a function of the growth of the domestic industry between 1998 and 1999. Countries must consider economic data during the entire period of investigation of at least three years when making injury determinations.

[22]I calculate an index of industrial production for the European Union using a GDP-weighted average of the reported index from member countries.

[23]Industry-specific data limitations prevent me from calculating these shares on an annual basis. Therefore, for each country I measure the shares using data from the year in which the most industry-specific data is available, which ranges from 1990 to 1995 depending on the country.

in the industry (*Tariff*). Specifically, I utilize the average ad valorem tariff rate reported for the three-digit ISIC industry in the World Bank's Trade and Production database in 1999.[24] As indicated in Table [2], developing countries have much higher tariff rates on average than higher-income countries. Therefore, I also interact the tariff rate variable with a dummy variable that equals one if the importing country is a developing country.[25]

As noted in Section [2], some papers have discovered that political pressure may take the form of bias against certain trading partners. I hypothesize that the likelihood of an affirmative injury decision may depend on the level of development of the country under investigation, for several reasons. Industries within less-developed countries may be less likely to successfully defend themselves during the course of the investigation due to a lack of resources or knowledge. Countries may also be more likely to impose protection against developing countries if developing countries are less able to retaliate against the importing country.[26] Both explanations suggest that the the level of development of the exporting country should be negatively correlated with the probability of an affirmative injury determination. I also include the level of development of the importing country as a possible explanatory variable in an effort to determine whether developing countries are more or less likely to impose antidumping protection than higher income countries. To measure the level of development in the exporting and importing country, I use the real GDP per capita from the World Bank's World Development Indicators.

Finally, I include several macroeconomic variables associated with the countries involved in the investigation. Both Knetter and Prusa (2003) and Feinberg (2005) find that countries are more likely to file petitions following a real appreciation of a country's currency or a fall in

[24] I specifically use the tariff averages calculated from UNCTAD's TRAINS database. Annual tariff rate averages are unavailable for the full sample period. I choose to use data from 1999 because it is the mid-point year in the sample period.

[25] I define developing countries as those with a real per capita GDP of less than $9,000. This value was chosen to ensure that each importing country remained either a developing or high-income country for the entire sample period.

[26] Feinberg and Reynolds (2006) find that countries initiate many antidumping investigations in order to retaliate against the antidumping measures imposed upon their exporters in the past. Thus, if a country is unable to retaliate the investigating authority may feel free to impose antidumping protection without fear of reprisal.

the country's GDP growth, at least in Australia, Canada, European Union, and the United States. The authors hypothesize that both factors make it more likely that the government will find that the domestic industry has been injured by imports from the foreign country, resulting in the imposition of antidumping duties. To account for these macroeconomic determinants I include the log bilateral real exchange rate (*Exchange Rate Change*) and real GDP growth in the investigating country (*Importer's GDP Growth*) and exporting country (*Exporter's GDP Growth*).[27] The real GDP growth rates are the two-year growth rates, or the two year's prior to the initiation of the investigation.

Because this research is particularly interested in the outcome of antidumping investigations since the passage of the WTO Antidumping Agreement, I limit my dataset to those investigations between 1995 and 2003. The final dataset includes 1,671 injury determinations across 12 countries and 28 three-digit ISIC Rev. 2 industries.[28] The distribution of injury determinations across industries and countries is described in Figure [1] and Table [1]. Summary statistics describing the dependent and explanatory variables are included in Table [2].

5 Results

As noted in Revelt and Train (1996), the model becomes empirically difficult to identify when all coefficients are allowed to vary in the population. When I allow all coefficients to be random, the model fails to converge within a reasonable number of iterations. Therefore, I

[27] I calculate the bilateral real exchange rate using nominal exchange rate data and consumer price indices from the International Monetary Fund's International Financial Statistics. Each bilateral exchange rate is normalized by dividing by the mean over 1995 to 2005 prior to taking logs. Thus a one percent appreciation of the importer's currency from the average rate over the period is expressed as 0.01. Real GDP data is collected from the World Bank's World Development Indicators.

[28] As noted above, the unit of observation in this research is an industry within a particular investigating country. The likelihood contribution of the observation is the product of the probability of observing the actual injury determinations in each of the petitions filed by the industry between 1995 and 2003. For example, the United States made injury determinations in 180 antidumping petitions filed by the U.S. iron and steel industry against between 1995 and 2003. The U.S. iron and steel industry is a single observation, and the likelihood contribution of this observation is the product of the probability of observing each of the actual injury determinations in the 180 investigations.

choose which coefficients to vary across the population by first assuming that all coefficients are random, then dropping one random coefficient at a time. I use likelihood ratio tests to determine whether the inclusion of the random component to the coefficient significantly improves the explanatory power of the model. Using this methodology, I determine that the coefficients on the importer's GDP growth, log(imports), industry's production growth, and the industry's share of GDP should be allowed to vary across countries and industries.

Parameter estimates from the random-coefficients probit model are presented in Table [4], while the marginal effects associated with these estimates are included in Table [5].[29] I also report the coefficient and marginal effect estimates from a random-effects probit model in Table [3]. This model assumes that countries place the same weight on all of the factors taken into consideration, essentially restricting the covariance matrix Γ to equal zero.[30] In specification 1 of the random-coefficients model the country-industry specific coefficients are defined only by the mean value of the parameter, reported in column [1] of Table [4], and an unobserved random component. The estimated standard errors of the random components are reported in column [2]. The likelihood ratio statistic associated with the test that the random-coefficient probit model fits the data better than the random-effects probit model is included in the final row of Table [4]. Based on this test statistic, I reject the null hypothesis that the variance on the random-parameters should be equal to zero.

The results from the random coefficients model differ significantly from the random-effects model in a number of important ways. As expected, both models predict that the value of imports has a positive and significant impact on the likelihood that the country will make an affirmative injury determination. Specifically, the results suggest that a 10 percent increase in the value of imports from the country under investigation increases the likelihood of an affirmative determination by 0.17 percentage points. However, the estimated standard deviation of this parameter in the random-coefficient model is also significant, suggesting that the marginal effect of imports on the probability of an affirmative determination varies significantly across countries and industries. Similarly, both models find that the average

[29] Please see the appendix for a description of the calculation of the average marginal effects and their standard errors.

[30] In other words, the random-effects probit model can be thought of as a restricted version of the random-coefficients probit model in which only the constant term is allowed to vary across countries and industries.

impact of the importer's GDP growth on the likelihood of an affirmative injury determination is statistically insignificant. However, the estimated standard deviation on this parameter from the random-coefficient model is quite large and statistically significant, suggesting that this macroeconomic variable may play a more important role in investigations conducted by some importing countries.

Although theoretically the likelihood of finding evidence that dumped imports have injured the domestic industry should fall as the industry increases its output, the results from the random-effects probit model suggest that production growth has a *positive* and significant impact on the likelihood of an affirmative injury determination.[31] The random-effects model predicts that a one percentage point change in the industry's production growth will result in a 0.40 percentage point increase in the likelihood of an affirmative determination.

The estimates from the random-coefficients probit model help to explain this counter-intuitive result. As Table [4] shows, the parameters from this model suggest instead that the average impact of the production growth in the industry is statistically indistinguishable from zero, but this impact varies significantly across countries and industries. While investigations involving certain importing countries and industries are more likely to result in the imposition of duties as industrial production increases, investigations involving other importing countries and industries are less likely to result in duties when faced with the same conditions in the domestic industry.

Figure [2] graphs a kernel density estimation of the country-industry specific marginal effect of the industry's production growth on the likelihood of an affirmative injury determination.[32] The dotted line graphs the density of the parameter from the random-effects model, while the solid line graphs the density of the estimated country/industry specific parameters from the random-coefficients model. Although the results from the random-coefficients model make more intuitive sense than the results from the baseline model, it is still puzzling why some countries would be more likely to find that the domestic industry has been injured by dumped imports when production growth in the industry increases. This may be a sign

[31] This result does not seem to be caused by collinearity between the industry's production growth and other variables in the model such as the importing country's GDP growth or GDP per capita. Results from models excluding these variables were virtually identical to those discussed here.

[32] Please see the Appendix for a description of these calculations.

that countries want to protect high-growth industries to ensure continued success.

The parameter estimates associated with the non-random parameters are virtually identical in both the random-effects and random-coefficients models. For example, the results indicate that antidumping petitions are marginally less likely to be successful the higher the income of the country under investigation as hypothesized. A $1,000 increase in the exporting country's GDP per capita reduces the likelihood of an affirmative determination by about 0.2 percentage points.

I find that a one percent appreciation of the exporting country's currency decreases the likelihood of an affirmative injury determination by 0.14 percent. This result is seemingly counter to the results in both Knetter and Prusa (2003) and Feinberg (2005), which find that countries are more likely to file a petition following a real appreciation of the importing country's currency. Both authors attribute this to the fact that the real appreciation increases the likelihood of an affirmative injury determination. Theoretically, however, a real appreciation can either increase or decrease the probability of an affirmative injury determination.

As described in Knetter and Prusa (2003), a depreciation of the exporting country's currency will cause its marginal costs, as measured in the importing country's currency, to fall. Under exchange rate pass through theory, this will typically cause the exporting industry to lower its price in the importing country. The domestic industry will then be forced to either lower its price or lose market share, causing its profits to fall and *increasing* the likelihood that their government will make an affirmative injury determination. However, if the foreign industry reduces its price by less than the exchange rate depreciation, or engages in incomplete pass-through, it has actually increased its export price as measured in the foreign currency; this relative price increase should reduce the dumping margin determination by the importing country. To the extent that the government takes into account the dumping margin in the injury determination, the depreciation of the exporting country's currency will *decrease* the likelihood of an affirmative injury determination.

In contrast to Feinberg (2005) and Knetter and Prusa (2003), Feinberg (1989) finds that countries are less likely to file a petition following a real appreciation, which he attributes to the fact that the appreciation typically causes dumping margins to be lower. It seems from the results of this sample that on average the negative impact of the lower dumping margin on the probability of an affirmative injury determination more than offsets any increase in this probability that occurs because the appreciation makes domestic firms worse off as imports increase.

One might expect that a weak foreign economy would prompt the foreign industry to lower its export prices in an effort to increase exports and maintain its total production in the face of lower domestic sales. If this was the case, the likelihood of an affirmative injury determination should be negatively related to the growth in the exporting country's GDP. This hypothesis has been rejected by other empirical studies. Knetter and Prusa (2003), for example, find an insignificant relationship between world GDP growth and the number of antidumping petitions filed. The results from both the random-effects and random-coefficient models instead indicate that a one percentage point increase in the exporting country's GDP growth rate increases the likelihood of an affirmative injury determination by about 0.3 percentage points.

Other variables that have been shown in the past to be significant are statistically insignificant in this sample of 12 countries. For example, none of the political variables, including the industry's share of employment, the industry's share of GDP and the industry's tariff rate, are statistically significant. The level of development of the importing country also has no significant impact on the probability of an affirmative injury determination. The insignificance may actually be another sign of heterogeneity in the methods used to determine injury across countries. Although these variables have been shown in other studies to be significant in decisions by individual countries such as the United States, the average impact of the variables across the 12 sampled countries is insignificant.[33]

5.1 Variance Across Countries

In the second specification presented in Table [4], I attempt to explain part of the estimated variance of the random coefficients using country-specific characteristics. Specifically, I allow the random-parameters to vary according to whether the investigating country is a

[33]For example, the estimates from the estimation of the random-effects model limited to the United States indicate that the tariff rate has a positive and significant impact on the likelihood of an affirmative injury determination.

developing country. Because the traditional users of antidumping regulations are all high-income countries, developing countries tend to have less experience undertaking antidumping investigations. Developing countries may also have less access to current, reliable economic data, and have fewer resources to devote to the investigation. Based on the likelihood ratio statistic reported in Table [4], I reject the null hypothesis that the average values of the random parameters are equal across developing and high-income countries as assumed in the first specification reported in the Table.

The results suggest a number of interesting differences in the determinants of injury investigations in developing and high-income countries. For example, allowing the average value of the random-coefficients to vary according to the level of development of the investigating country significantly changes the marginal impact of some of the fixed parameters. Although the investigating country's GDP per capita was statistically insignificant in previous specifications, this characteristic has a significant negative impact on the likelihood of an affirmative injury determination once the value of the random-coefficients are allowed to vary by level of development. Note that in this specification the constant term is also allowed to vary by level of development. In other words, the results indicate that conditional on whether the country is defined as a "developing" or "high-income" country, the likelihood of an affirmative injury determination decreases with the investigating country's GDP per capita.

The average value of the random-coefficient associated with the industry's share of GDP is insignificant for both developing and high-income countries, as it was when the average value was assumed to be the same across both groups of countries. However, when this average value is allowed to vary across the level of income of the investigating country, the standard error becomes much larger and statistically significant. This suggests that political factors such as the relative economic importance of the industry can sometimes play a significant role in injury determinations, as found in earlier studies.

Parameter values associated with the impact of the value of imports on the likelihood of an affirmative injury determination indicate that the entire variance across countries and industries can be explained by the level of development of the investigating country. Once the average impact of imports is allowed to differ across developing and high-income countries, the standard deviation on the random parameter becomes insignificant. Figure [3] graphs the kernel density estimates of the country-industry specific marginal impact of log (imports) on the likelihood of an affirmative injury determination. The graph clearly shows that the marginal impact of imports is always higher in high-income countries than in developing countries. Specifically, a 10 percent increase in imports results in a 0.29 percentage point increase in the likelihood of an affirmative determination in high-income countries, but a statistically insignificant increase in developing countries.

Recall that the impact of the exporter's *share* of industry imports proved to be statistically insignificant in earlier specifications. The results when the random-coefficients are allowed to vary according to level of development instead suggest that the share of imports also has a statistically significant, positive impact on the likelihood that a country will make an affirmative injury determination.

5.2 Variance Across Industries

I also investigate whether the variance in the random-coefficients can be explained by industry-specific characteristics. For example, a number of authors have hypothesized that current antidumping regulations may result in the imposition of higher levels of protection on agricultural products than manufactured goods due to the unique characteristics of the agriculture industry.[34] These authors note that many agricultural commodities' prices and output fluctuate in cycles that often last more than the two or three years typically used in the government's calculation of injury and dumping. As a result, the government is almost guaranteed to find evidence of dumping and injury during periods of investigation that occur during low-points in the cycle if they fail to take this cyclical nature into account. Unfortunately, none of the industry-specific characteristics I have employed, including many of the political explanatory variables included in this dataset, proved to be significant determinants of the random-parameters.

Attempts to allow the average random-parameter to vary according to whether the industry under investigation was in the agricultural sector failed to converge within a reasonable

[34]For an overview of this literature, see Reynolds (2006).

number of iterations.[35] This does not necessarily prove, however, that current antidumping regulations do not result in different outcomes depending on whether the investigation involves the agricultural sector. Note from Table [6] that the characteristics of the industries filing antidumping petitions in the manufactured sector are vastly different from the characteristics of industry's filing antidumping petitions in the agricultural sector. For example, the industry's share of GDP and employment, and the exporter's share of industry imports, are noticeably higher in cases involving the agriculture sector than other cases. Similarly, the average industry's production growth is noticeably lower in cases involving the agriculture sector than in the manufacturing sector.

These differences in the explanatory variables can have a dramatically different impact on the predicted outcomes of antidumping investigations. For example, Figure [6] graphs the average predicted probability of an affirmative injury determination in investigations involving manufactured and agricultural products as the industry's production growth increases using the estimates of the random-coefficients model.[36] As noted before, the average marginal impact of the industry's production growth is indistinguishable from zero in the full sample, resulting in the virtually flat predicted probability curve for the full-sample as well as the sub-sample of manufactured goods. However, the graph of the predicted probability for the agricultural sector shows a distinct negative impact of the industry's production growth on the likelihood of an affirmative injury determination as might be expected based on current antidumping regulations.

6 Conclusion

This paper explores the differences in the determinants of antidumping injury investigations across countries and industries. Although one might expect that these determinants should be fairly consistent across countries under the World Trade Organization's Antidumping Agreement, the results instead reveal a number of significant differences. For example,

[35] This could be due to the fact that there are too few investigations involving agricultural products within the sample to identify a significant difference between the determinants of injury investigations involving manufactured versus agricultural products.

[36] Please see the Appendix for a description of how these calculations were made.

while some countries are less likely to make an affirmative injury determination as the industry's production growth or the country's GDP growth rate increases, production growth and health of the domestic economy are positively correlated with the probability of an affirmative injury determination in other countries. Similarly, the value of imports from the country under investigation has a much higher impact on the likelihood of success in high-income countries than in developing countries.

The results have important implications both for future research on the outcomes of antidumping investigations and for future WTO negotiations on antidumping regulations. Future researchers should take into consideration the fact that estimated average parameters or marginal effects may mask significant differences across countries and industries. If members of the WTO value consistency in antidumping determinations across countries, they should consider whether more stringent regulations are needed in the WTO's Antidumping Agreement.

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A Appendix: Calculation of Average Marginal Effects

This appendix describes the calculation of the average marginal effects and their standard errors reported in Table [5] and used in the kernel density estimation illustrated in Figures [2] and [3]. These average effects and their standard errors are also used in the calculation of the predicted probabilities illustrated in Figure [6]. The methodology employed is similar to one suggested in Train [2003].

Define $\widehat{\theta}$ as the estimate of the vector of parameters of the model $(\beta, \gamma, \delta, \Gamma)$ and $\widehat{\Sigma}$ as the asymptotic covariance matrix of these estimates. To estimate the average marginal impact of the explanatory variables, $\overline{\Psi_{ci}}$, on the likelihood that country c will make an affirmative injury determination in a case filed by industry i, the following steps are taken:

1. Draw a vector of parameters from the distribution of $\widehat{\theta}$. Specifically, draw a vector of K standard normal errors, η^s, where K is the number of parameters in the model. The draw of parameters is:

$$\theta^s = \widehat{\theta} + W\eta^s$$

   where W is the Choleski factor of $\widehat{\Sigma}$.

2. Calculate the average marginal effect for each country-industry combination. Note that the average marginal effect is defined as:

$$\overline{\Psi^s_{ci}} = \int_{\gamma^s_{ci}} \gamma^s_{ci}\phi(\overline{x_{cip}}\beta^s + \overline{z_{cip}}\gamma^s_{ci}) f(\gamma^s_{ci}|\gamma^s, \Delta^s, \Gamma^s, \overline{w_{ci}})\partial\gamma^s_{ci}$$

$$\gamma^s_{ci} = \gamma^s + \Delta^s\overline{w_{ci}} + \Gamma^s v_{ci},\ v_{ci} \sim N(0,1)$$

   However, as noted before this integral cannot be calculated analytically. Instead, the average marginal effect must be similated as in the similation of the likelihood contribution as described in Section [3]. The average marginal effect is simulated as:

$$\overline{\Psi^s_{ci}} = \frac{\frac{1}{R}\sum_{r=1}^{R}\Psi^{sr}_{ci}L^{sr}_{ci}}{\frac{1}{R}\sum_{r=1}^{R}L^{sr}_{ci}}$$

$$\overline{\Psi^{sr}_{ci}} = \gamma^{sr}_{ci}\phi(\overline{x_{cip}}\beta^s + \overline{z_{cip}}\gamma^{sr}_{ci})$$

$$\gamma^{sr}_{ci} = \gamma^s + \Delta^s\overline{w_{ci}} + \Gamma^s v^r_{ci}$$

   where L^{sr}_{ci} is the log likelihood contribution for country c and industry i associated with the r^{th} draw of γ^s_{ci}.

3. Repeat steps 1 and 2 S times. The average of $\overline{\Psi_{ci}^s}$ over the s draws of $\widehat{\theta}$ is the mean marginal effect of the explanatory variables on the injury determination of country c in a petition filed by industry i. These country-industry specific average marginal effects are used in the kernel density estimation illustrated in Figures[2] and [3].

Note that this methodology involves a simulation within a simulation. The average marginal effects and associated standard errors reported in Table [5] are the average of these country-industry specific average marginal effects over either the full sample or the developing country and high-income country sub-samples. The standard errors account for both the sampling variance in the estimated population parameters associated with Σ as well as the standard deviation of the individual's marginal effects from the population average, which is closely tied to the estimated parameters in Γ.

Figure 1:

Antidumping Injury Decisions by Country, 1995-2003

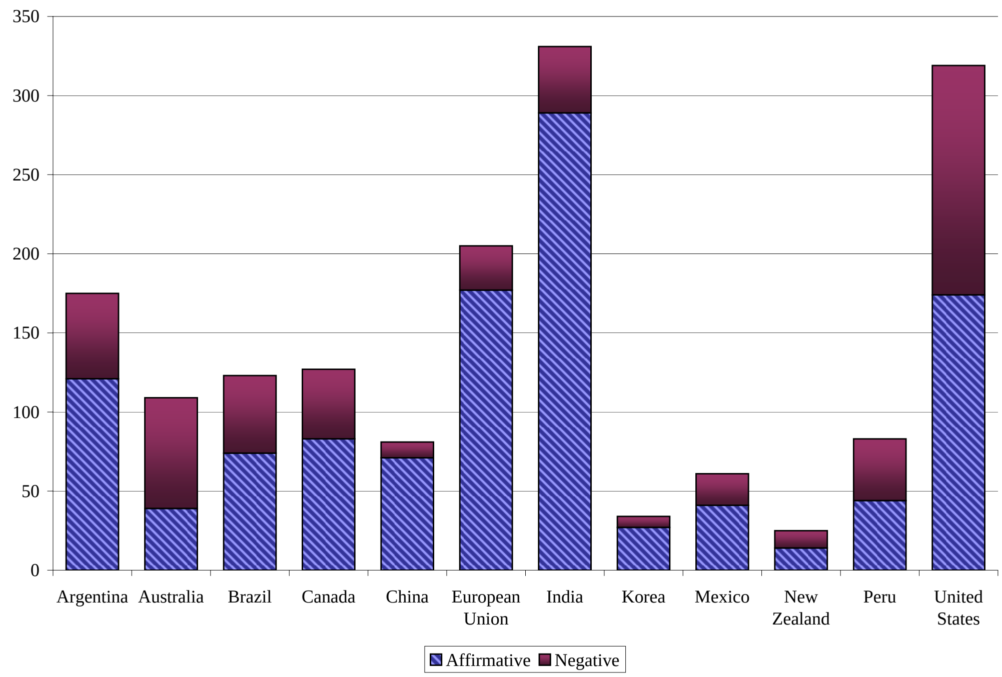

Figure 2:

Distribution of the Marginal Effect of Production Growth

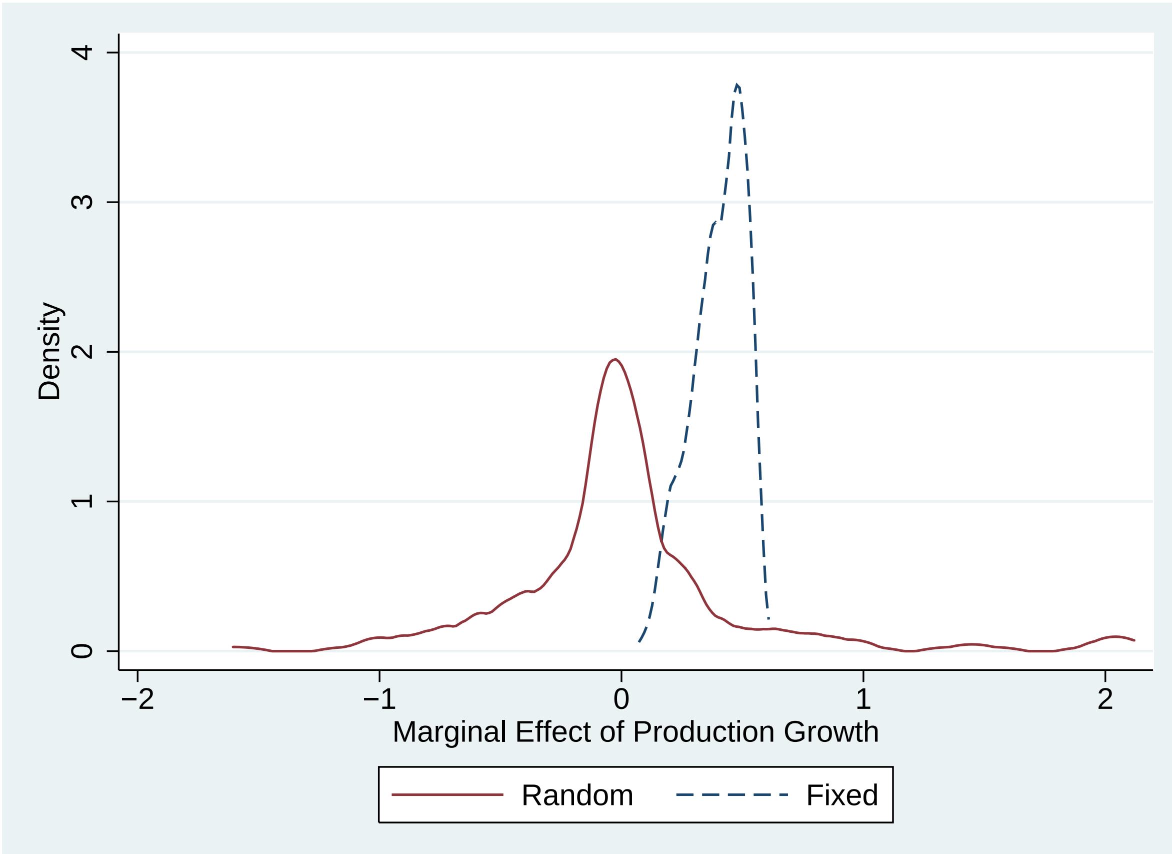

Figure 3:

Distribution of the Marginal Effect of Log(Imports)

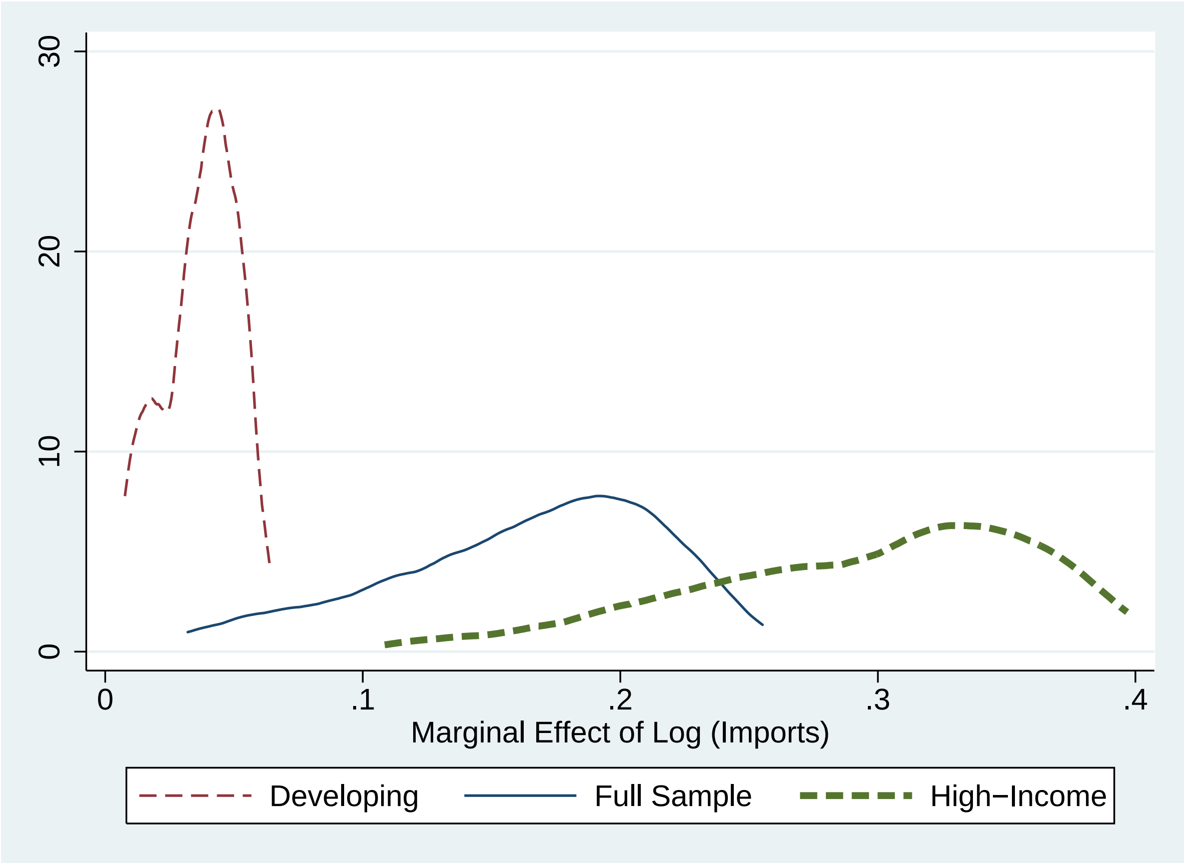

Figure 4:

Predicted Probability of an Affirmative Injury Decision with Confidence Intervals

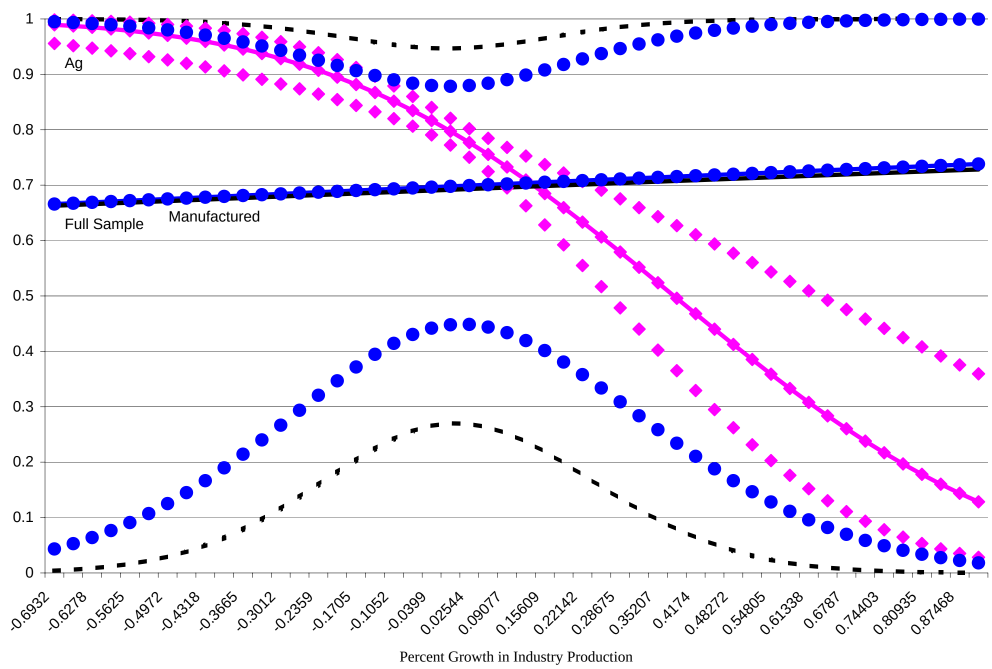

Table 1:

Antidumping Injury Decisions by Industry, 1995-2003

ISIC	Industry	Total Investigations	Percent Affirmative	Percent Negative
110	Agriculture, Hunting, Forestry and Fishing	20	55	45
210	Mining	1	100	0
311	Food Manufacturing	62	63	37
313	Beverage Manufacturing	1	100	0
321	Textiles	60	90	10
322	Apparel	24	0	100
323	Leather Products	3	100	0
324	Footwear	16	56	44
331	Wood Products	9	89	11
332	Furniture and Fixtures	2	100	0
341	Paper products	71	56	44
342	Printing and Publishing	8	50	50
351	Industrial Chemicals	495	73	27
352	Other Chemical Products	21	90	10
353	Petroleum Refineries	2	100	0
354	Petroleum and Coal Products	6	67	33
355	Rubber Products	49	76	24
356	Plastic Products	9	100	0
361	Pottery and China	3	100	0
362	Glass Products	20	45	55
369	Non-metallic Mineral Products	25	44	66
371	Iron and Steel	478	68	32
372	Non-ferrous Metal	24	75	25
381	Fabricated Metal Products	59	88	12
382	Non-electrical Machinery	66	62	38
383	Electrical Machinery	75	72	28
384	Transport Equipment	19	63	37
385	Professional and Scientific Equipment	24	58	42
390	Other Manufactured Goods	18	67	33

Table 2:

Summary Statistics

	Mean	Std. Error	Min.	Max.
Full Sample				
Injury	0.689	0.011	0.000	1.000
Importers's GDP Growth	0.068	0.001	-0.160	0.202
Log(Imports)	8.588	0.065	0.000	15.851
Production Growth	0.025	0.002	-0.693	0.940
Industry's Share of GDP	0.009	0.001	0.001	0.255
Exporter's GDP per Capita	10.450	0.280	0.245	45.206
Importer's GDP per Capita	13.694	0.303	0.370	36.789
Exchange Rate Change	0.050	0.004	-0.849	1.002
Exporter's GDP Growth	0.074	0.002	-0.390	0.327
Exporter's Share of Imports	0.148	0.005	0.000	1.000
Industry's Share of Employment	0.008	0.001	0.001	0.261
Tariff	0.132	0.003	0.006	0.400
No. of Obs.		1,671		

	Developing		High-Income	
	Mean	Std. Error	Mean	Std. Error
Injury	0.748	0.015	0.628	0.017
Importers's GDP Growth	0.072	0.002	0.065	0.001
Log(Imports)	7.627	0.088	9.588	0.084
Production Growth	0.031	0.004	0.020	0.002
Industry's Share of GDP	0.009	0.001	0.009	0.001
Exporter's GDP per Capita	11.265	0.403	9.603	0.388
Importer's GDP per Capita	2.903	0.951	24.921	0.269
Exchange Rate Change	0.074	0.008	0.256	0.005
Exporter's GDP Growth	0.076	0.002	0.072	0.003
Exporter's Share of Imports	0.166	0.007	0.129	0.006
Industry's Share of Employment	0.009	0.001	0.006	0.001
Tariff	0.218	0.003	0.004	0.001
No. of Obs.	852		819	

Table 3:

Determinants of Antidumping Injury Decisions, 1995-2003

Random Effects Probit Model		
	Parameter Estimate	Marginal Effect
Importer's GDP Growth	-1.311	-0.364
	(1.205)	(0.335)
Log(Imports)	0.064*	0.017*
(Imports in thousands)	(0.018)	(0.007)
Production Growth	1.448*	0.401*
	(0.559)	(0.196)
Industry's Share of GDP	0.810	0.225
	(0.720)	(2.524)
Exporter's GDP per Capita	-0.009*	-0.002*
(in thousands)	(0.004)	(0.001)
Importer's GDP per Capita	-0.013	-0.036
(in thousands)	(0.011)	(0.034)
Exchange Rate Change	-0.522*	-0.144*
	(0.198)	(0.074)
Exporter's GDP Growth	0.988**	0.274
	(0.549)	(0.182)
Exporter's Share of Industry Imports	0.352	0.097
	(0.235)	(0.070)
Industry's Share of Employment	3.020	0.842
	(5.920)	(1.706)
Tariff	1.6607	0.508
	(2.331)	(0.756)
* Developing	0.875	0.631**
	(2.265)	(0.360)
Constant	-0.135	
	(0.296)	
σ_v	0.707*	
	(0.089)	
Number of Observations	1,671	
Log Likelihood	-897.767	

Standard errors reported in parentheses. *,** indicate those parameters significant at the 5 and 10 percent significance level, respectively.

Table 4:

Determinants of Antidumping Injury Decisions, 1995-2003

Random Coefficients Probit Model				
	(1)		(2)	
	Mean γ	Std. Error	Mean γ	Std. Error
Importer's GDP Growth	-1.642	6.544*	-4.607	7.702*
	(1.558)	(1.150)	(3.396)	(1.188)
* Developing			3.285	
			(3.814)	
Log(Imports)	0.064*	0.018*	0.101*	0.002
(Imports in thousands)	(0.019)	(0.009)	(0.025)	(0.012)
* Developing			-0.085*	
			(0.034)	
Production Growth	-.057	4.704*	1.462	4.794*
	(1.107)	(1.276)	(1.645)	(1.183)
* Developing			-1.007	
			(1.973)	
Industry's Share of GDP	2.890	7.780	-4.960	18.750*
	(9.490)	(10.920)	(13.070)	(7.220)
* Developing			0.540	
			(18.220)	
Exporter's GDP per Capita	-0.010*		-0.011*	
(in thousands)	(0.004)		(0.004)	
Importer's GDP per Capita	-0.009		-0.004*	
(in thousands)	(0.009)		(0.001)	
Exchange Rate Change	-0.444*		-0.402**	
	(0.216)		(0.217)	
Exporter's GDP Growth	1.202*		1.312*	
	(0.576)		(0.584)	
Exporter's Share of Industry	0.394		0.531*	
Imports	(0.245)		(0.242)	
Industry's Share of Employment	0.130		2.180	
	(6.110)		(6.750)	
Tariff	1.673		0.401	
	(2.472)		(2.477)	
* Developing	2.038		3.576	
	(2.465)		(2.950)	
Constant	-0.222	0.658*	0.303	0.461*
	(0.287)	(0.082)	(0.462)	(0.068)
Developing			-0.260	
			(0.462)	
Number of Observations	1,671		1,671	
Log Likelihood	-883.497		-874.249	
L.R. Test Statistic	28.542		18.494	

Standard errors reported in parentheses. *,** indicate those parameters significant at the 5 and 10 percent significance level, respectively.

Table 5:

Marginal Effects from Random Coefficients Probit Model

	(1)	(2)	
	Full Sample	Developing	Higher Income
Importer's GDP Growth	-0.581	-0.612	-1.468
	(0.876)	(1.141)	(1.407)
Log(Imports)	0.016*	0.004	0.029*
(Imports in thousands)	(0.007)	(0.007)	(0.010)
Production Growth	0.018	0.123	0.421
	(0.599)	(0.714)	(0.656)
Industry's Share of GDP	0.650	-1.310	-1.600
	(2.800)	(3.950)	(4.380)
Exporter's GDP per Capita	-0.003*	-0.003**	-0.003*
(in thousands)	(0.001)	(0.001)	(0.001)
Importer's GDP per Capita	-0.002	-0.008**	-0.010*
(in thousands)	(0.002)	(0.005)	(0.004)
Exchange Rate Change	-0.115*	-0.095	-0.117
	(0.075)	(0.069)	(0.072)
Exporter's GDP Growth	0.310*	0.310*	0.382*
	(0.185)	(0.187)	(0.182)
Exporter's Share of Industry	0.101	0.125	0.154**
Imports	(0.076)	(0.081)	(0.081)
Industry's Share of Employment	0.030	0.500	0.620
	(1.660)	(1.640)	(1.910)
Tariff	0.658	0.941	0.114
	(0.630)	(0.537)	(0.719)

Standard errors reported in parentheses. *,** indicate those parameters significant at the 5 and 10 percent significance level, respectively.

Table 6:

Summary Statistics

	Manufactured		Agriculture	
	Mean	Std. Error	Mean	Std. Error
Injury	0.691	0.011	0.550	0.114
Importers's GDP Growth	0.068	0.001	0.066	0.001
Log(Imports)	8.554	0.065	11.334	0.296
Production Growth	0.025	0.002	0.002	0.012
Industry's Share of GDP	0.009	0.002	0.037	0.012
Exporter's GDP per Capita	10.431	0.282	12.048	2.958
Importer's GDP per Capita	13.554	0.304	25.292	2.717
Exchange Rate Change	0.051	0.005	-0.014	0.023
Exporter's GDP Growth	0.074	0.002	0.097	0.012
Exporter's Share of Imports	0.145	0.005	0.458	0.078
Industry's Share of Employment	0.007	0.002	0.066	0.018
Tariff	0.131	0.003	0.163	0.002
No. of Obs.	20		1,651	