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# Cyclical Dumping and US Antidumping Protection: 1980-2001

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## Abstract

This paper estimates the impact of economic conditions in foreign industries on the filing of antidumping petitions by US industries and the US government's decision in preliminary and final antidumping investigations. Exploiting cross-country variation in economic shocks in manufacturing, I estimate a joint model of filing decisions by the US industry and antidumping decisions by the US government.

I find strong evidence that economic weakness in a foreign industry is associated with an increase in the probability of antidumping protection. After controlling for other political and economic factors that likely drive industry filing and government decisions including US GDP growth, I find that a one standard deviation fall in the growth of employment (consumption) in a foreign economy's manufacturing industry doubles (triples) the joint probability that the US industry will file an antidumping petition and the US government will impose a preliminary (temporary) antidumping measure. The effect of weakness in a foreign economy is even larger for final antidumping measures. A one standard deviation fall in foreign employment (consumption) growth increases the joint probability that a petition will be filed and a final (long-lasting) antidumping measure will be imposed by a factor of five (seven). In finding that US trade policy is applied counter-cyclically to foreign economic fluctuations, the paper suggests that trade policy may reduce the extent of business cycle transmission across countries.

JEL Codes: F12, F13

Keywords: dumping, anti-dumping, counter-cyclical policy

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# 1 Introduction

Under the GATT-WTO system, countries which have negotiated reductions in tariffs and other trade barriers have limited ability to institute new trade barriers. However, the GATT includes provisions which allow countries to reintroduce trade barriers if specific economic criteria are met. Antidumping duties, permitted under the GATT's agreement on dumping, have become extremely popular among WTO members around the world (Miranda, Torres and Ruiz, 1998). According to the GATT, antidumping duties may be imposed if a country's trading partners are selling products at "dumped" prices and if there is evidence that the country's domestic industry is injured by this dumping.

This paper tests the theory that weak economic conditions in a foreign economy can induce a particular type of dumping prohibited by the GATT, cyclical dumping or temporarily pricing below the average total cost of production.<sup>2</sup> Models of cyclical dumping (Ethier, 1982; Staiger and Wolak, 1992; Crowley, 2007) predict that declines in the demand for a product in a foreign market will lead to increased exports sold at a price in the importing country that is below the average total cost of production. Using country-specific information on foreign economic shocks in manufacturing industries, I estimate a joint model of filing decisions by the US industry and antidumping decisions by the US government. I find that a decline in economic conditions in a foreign industry has a statistically and economically significant effect on the filing of antidumping petitions and the government's decision to impose antidumping measures. After controlling for other political and economic factors that likely drive industry filing and government decisions, including US GDP growth, I find that a one standard deviation fall in the growth of employment (consumption) in a foreign economy's manufacturing industry doubles (triples) the joint probability that the US industry will file an antidumping petition and the US government will impose a preliminary (temporary) antidumping measure. The effect of weakness in a foreign economy is even larger for final antidumping measures. A one standard deviation fall in foreign employment (consumption) growth increases the joint probability that a petition will be filed and a final (long-lasting) antidumping measure will be imposed by a factor of five (seven).

Because even temporary, preliminary antidumping measures can have trade-restricting effect, I estimate models of both preliminary and final outcomes. In a binary model of the government's

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<sup>2</sup>Clarida (1996) presents estimates from a variety of sources that the definition of dumping as pricing below the average total cost of production is used in about 2/3 of US antidumping cases.

preliminary protection decision with industry selection into the antidumping process, the growth rate of employment in the foreign industry affects the government's decision to apply a preliminary antidumping measure. Conditional on an industry filing a request for antidumping protection, a one standard deviation fall in the growth of industry-level foreign employment in the year prior to the filing of the petition is associated with a modest increase in the probability of a preliminary measure of 0.74 percentage points. More importantly, a one standard deviation fall in foreign employment growth increases the probability of filing (0.23 percentage points) and, thus, more than doubles the joint probability that a petition will be filed and a preliminary measure will be imposed from 0.14% to 0.32%.

An interesting difference arises in estimating the role of foreign demand shocks on the government's final determination of whether or not to impose a final measure jointly with the industry's decision to file a petition. In the final decision, which takes place between 235 and 295 days after the filing of a petition<sup>3</sup>, the lagged growth of industry-level foreign employment is not a statistically significant determinant of the government's decision to impose a final long-lasting antidumping measure. However, because foreign economic conditions are a significant determinant of industry filings, a one standard deviation fall in foreign employment growth dramatically increases the joint probability of a filing and a final measure from 0.09% to 0.52%

This is the first paper that I am aware of to show empirically that US trade policy responds to adverse economic fluctuations in a foreign economy. This paper shares similarities with earlier work by Knetter and Prusa (2003) on the macro-economic factors underlying antidumping filing in that both papers exploit inter-temporal variation to identify the relationship between economic fluctuations and antidumping. Consistent with their findings and those of Feinberg (2005) and Jallab, Sandretto, and Gbakou (2006), I find that the probability of filing is increasing with an appreciation of the importing country's real exchange rate. However, my analysis differs from Knetter and Prusa (2003) by utilizing country and industry-specific inter-temporal variation to explain differences in filing behavior across accused countries and industries. While Knetter and Prusa found no statistically significant relationship between filing rates aggregated across industries and across accused countries and an aggregate measure of rest-of-world GDP growth over the 3 years prior to filing, my analysis finds that higher frequency, annual fluctuations in the foreign

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<sup>3</sup>The final dumping determination takes place between 235 and 295 days after the filing of a petition in normal cases, but can be delayed to a time range of 285 to 345 days in special circumstances. The final injury decision takes place 280-340 days after the filing of a petition in normal cases and 330-390 days in special circumstances.

economy's industry in the year prior to filing are an important determinant of filing.

Among theoretical models of dumping, the literature has developed into two strands that yield opposing predictions about the relationship between economic fluctuations in the foreign economy and the existence of dumping. Beginning with the seminal contribution of Ethier (1982), a number of papers (Staiger and Wolak, 1992, 1994; Crowley, 2007) model a realization of weak foreign demand as the driving force behind dumping. In contrast, Clarida (1993) develops a competitive model of entry and firm learning about technology to show that dumping can arise during periods of high worldwide demand. Similarly, Hartigan (1996) builds a duopoly model in which dumping occurs when foreign demand is high. The contribution of the current paper is that provides empirical support to models in which weak foreign demand drives dumping.

Previous empirical research on the determinants of antidumping filings and the outcomes in investigations has emphasized political factors (Hansen, 1990; Moore, 1992; Hansen and Prusa, 1997), specific aspects of the legal/bureaucratic institutional framework (Hansen and Prusa, 1996; Blonigen, 2006), trade policy retaliation (Blonigen and Bown, 2003<sup>4</sup>; Prusa and Skeath, 2002; Feinberg and Reynolds, 2006) or economic factors (Moore, 1992; Baldwin and Steagall, 1994; Staiger and Wolak, 1994; and Knetter and Prusa, 2003). The approach here builds on the previous empirical literature but utilizes a previously unexploited source of variation to identify a relationship between foreign economic fluctuations and dumping.

Section 2 describes the antidumping process in the United States. Section 3 presents the empirical model. Section 4 describes the data. Section 5 presents the empirical results and section 6 concludes.

## 2 Antidumping in the United States

This paper attempts to use information on the antidumping process in the United States over the period 1980-2001 to identify the role that industry-level cyclical economic factors in foreign economies play in dumping. In the course of an investigation that determines the existence and

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<sup>4</sup>Blonigen and Bown (2003) share a methodological similarity to this paper in that they exploit cross-country variation in petition filing to identify the effect of the threat of retaliation measured as foreign market size on filing decisions. Because their analysis utilizes cross-sectional data, they abstract away from the cyclical factors that theory predicts could explain time-variation in dumping behavior by foreign firms.

domestic consequences of dumping, the US government collects and analyzes private business proprietary data on prices and costs of domestic firms who make accusations of dumping and foreign firms accused of dumping. The government also analyzes a variety of publicly available data on output, imports and domestic employment that inform its decision in antidumping cases. Unfortunately, the econometrician who is interested in testing the theories of cyclical dumping cannot observe the business proprietary data on prices and costs that the government observes.

Nevertheless, I can observe industry and government decisions at several stages in the antidumping process. Furthermore, I have several measures that can proxy for the strength of demand in a foreign country's industry. The growth the growth of employment and the growth of consumption in the foreign country should all be highly correlated with the strength of demand in industry  $i$  in country  $j$ . According to cyclical dumping models, weakness in any of these variables in industry  $i$ , country  $j$  in year  $t$  induces (1) pricing below average total cost and (2) injury to the domestic import-competing industry (i.e., increased imports, lower domestic market share, lower domestic capacity utilization). Because weakness in foreign demand precipitates conditions that satisfy the legal definition of dumping, it should be associated with an increase in the probability of a petition by the domestic industry and an increase in the probability of protection.

Figure 1 presents, by antidumping petition status, the mean growth of foreign industry-level employment in the year before an antidumping petition is filed. This is the mean growth rate over 28 3 digit ISIC manufacturing industries for 49 countries between 1980-2001.<sup>5</sup> Figure 2 presents the mean growth of foreign industry-level consumption in the year prior to a filing. Beginning with figure 1, it appears that negative employment growth in a foreign industry is correlated with an antidumping case being filed and is also correlated with the imposition of a preliminary antidumping duty. Figure 2 shows that cases tend to be filed and preliminary duties tend to be imposed against foreign industries whose consumption growth is relatively weak. Somewhat surprisingly, the pattern appears reversed for final antidumping duties. In brief, this simple figure suggests that foreign economic conditions are relevant to antidumping protection. The empirical strategy in this paper is to use cross-industry cross-country and inter-temporal variation in antidumping decisions to identify if antidumping protection is induced by weak foreign demand and, if so, to quantify the increase in the probability of protection associated with economic weakness in foreign countries.

Identification of the effect of foreign demand strength on filings and outcomes comes from three sources of variation in the domestic-industry-foreign-country-year ( $ijt$ ) panel data. First, within an

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<sup>5</sup>The data used in these graphs are described in detail in section 4.

industry  $i$  in year  $t$ , there is variation across countries  $j$  both in whether or not they are included in an antidumping petition and in the government's determination of injury and dumping. Second, within a year  $t$ , there is variation across industries  $i$  in filing and protection decisions. Finally, there is intertemporal variation for industry  $i$  and country  $j$  in the timing of petition-filing by industries and the protection decisions by governments.

The US antidumping process can be broken into three distinct phases, each with its own data requirements: 1. initiation of a case, 2. a preliminary phase with a determination as to whether or not dumped imports are causing or threatening to cause injury to the domestic industry and a preliminary determination about the existence and magnitude of dumping, and 3. a final phase with determination about the existence and magnitude of dumping and a final injury determination.<sup>6</sup>

In the first step, a domestic industry  $i$  that produces a product (also denoted  $i^7$ ) must initiate or file a petition with the US Department of Commerce (DOC) and the US International Trade Commission (USITC) that claims that the industry is being materially injured or threatened with materially injury by reason of imports of good  $i$  at a price that is "less than fair value" from a single country  $j$  or multiple countries  $j = 1, 2, 3, \dots$ . Thus, the first margin of cross-country within-industry and within-year variation comes in the filing decision.<sup>8</sup>

Table 1 presents the frequency of filing a petition in industry  $i$  against country  $j$  in year  $t$  for the 272,639 industry-country-year observations in the unbalanced panel of 439 industries, 49 countries and 22 years used in this paper. The first important observation is that antidumping petitions are

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<sup>6</sup>A detailed description of the current antidumping process and a brief history of the evolution of US antidumping law since 1916 can be found in the *Antidumping and Countervailing Duty Handbook* published by the US International Trade Commission (2007). Although US trade law has been revised a number of times since the start of my data sample in 1980, the antidumping process is largely unchanged with one important exception. Beginning in 1984, the rule to cumulate imports from all countries listed in a petition during the injury investigation led to super-additivity in USITC decisions and a 20-30% increase in the probability of protection (Hansen and Prusa, 1996). However, as Hansen and Prusa (1996) note, "the ITC always makes its decisions on a country-by-country basis, even if imports from a set of countries are cumulated."

<sup>7</sup>In practice, the definition of the domestic "like product" is part of the investigation process. In general, the USITC definition of the "like product" is only a subset of the output of the 4 digit SIC 1987 industries that are the most finely disaggregated units available for a cross-sectional analysis in the US.

<sup>8</sup>Prusa (1997) and Benton (2001) exploit this variation to show that the country-specificity of antidumping protection leads to increased imports into the US (Prusa) and EU (Benton) from countries that are not specifically targeted by the antidumping measure.

a rare event. The row “Country  $j$  exports  $i$  to the US at  $t$  and is accused of dumping” indicates that the frequency of dumping accusations in the sample is less than 0.2% (545/272639). Second, the row “Country  $j$  exports  $i$  to the US at  $t$  and is not accused” captures the high degree of cross-country variation in petition filing. There are 8017 observations in the dataset in which a country  $j$  with positive exports to the US in industry  $i$  year  $t$  was *not* listed in a antidumping petition filed by the domestic US industry  $i$  in year  $t$ . Thus, while only 545 petitions were filed in the unbalanced manufacturing panel, an additional 8017 petitions *would have been filed* if the domestic industry had indiscriminately listed every country  $j$  that exported industry  $i$ ’s output to the US in year  $t$ . It thus appears that domestic industries are somewhat selective in their accusations of dumping.<sup>9</sup>

This selectivity is likely influenced by the economic and financial data which are included in an industry’s antidumping petition. In addition to data on the domestic industry itself (capacity, production, domestic sales, export sales, inventories, the number of production and non-supervisory workers, and income and loss data), a petition must include data on the foreign firms and countries accused of dumping. First, it must include the quantity and value of “less-than-fair-value” imports from each supplying country for the most recent 3 years. Second, it must include data directly related to the determination of dumping; i.e., the price charged by foreign firms in the US for the “dumped” product and the domestic firms’ price for the same product for the most recent 5 quarters.<sup>10</sup>

If a petition contains all the necessary information, the preliminary phase of the investigation begins. During the preliminary phase, the US International Trade Commission makes a preliminary determination of injury and/or threat of injury due to dumped imports for each country  $j$  listed in the petition. In making its decision, the USITC relies on information obtained through questionnaires sent to domestic producers, importers and foreign producers.<sup>11</sup> If the preliminary injury determination by the USITC is negative, the case ends with no antidumping duty. If the preliminary injury determination is affirmative, then the case proceeds to the US Department of

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<sup>9</sup>Blonigen and Bown (2003) explain this selectivity as partially due to a US industry’s fear of foreign retaliation.

<sup>10</sup>The International Trade Administration Form ITA-357P (OMB Control # 0625-0105) provides a detailed guideline of the price and cost information that must be included in a petition for antidumping protection.

<sup>11</sup>Domestic producers’ questionnaires request economic data on capacity, production, inventories, commercial shipments, export shipments, internal consumption, company transfers, employment, hours worked, wages, as well as financial data on income, losses, capital expenditures and sales prices. Importer questionnaires request data on the quantity and value of imports and sales prices. Finally, foreign producers’ questionnaires inquire about the firm’s capacity, production, home-market shipments, exports, and inventories.



Commerce for a preliminary dumping determination.<sup>12</sup>

During the second part of the preliminary phase, the US Department of Commerce makes a preliminary determination of dumping against each country  $j$  listed in a petition.<sup>13</sup> The dumping margin for country  $j$  is calculated as the difference in the price charged by country  $j$  producers in the US and country  $j$ , the US and a third market, or the difference between the price charged in the US price and the average total cost of production of a firm in country  $j$ . Preliminary dumping margins vary considerably across countries listed within a petition, with the USDOC occasionally finding that there is no evidence of dumping by some countries that have been found guilty of causing injury.<sup>14</sup>

To summarize the preliminary phase, a preliminary antidumping measure is imposed if both the USITC and the USDOC come to affirmative preliminary determinations. Cross-country variation in the application of a preliminary antidumping duty within a case can arise from cross-country variation in the injury decision or in the dumping determination. Interestingly, when petitions against individual countries are clustered into multicountry cases, we observe that roughly 73% of multi-country cases have outcomes in which all countries were found guilty of dumping and injury or no countries were found guilty of both dumping and injury. In the other 26% of cases, at least one country had a preliminary outcome that differed from that of the other countries accused in the multi-country case.

Table 2 provides evidence of this cross-country variation in preliminary outcomes for antidumping cases filed by US manufacturing industries between 1980 and 2001. The preliminary outcome is defined as affirmative if the US ITC finds preliminary evidence of injury or threat of injury and the USDOC finds preliminary evidence of dumping. The preliminary outcome is defined as negative if either agency makes a negative determination. The first column reports the number of countries

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<sup>12</sup>Although it is uncommon, the USITC occasionally splits its preliminary decision across countries. For example, in the 1993 case of phthalic anhydride (731-TA-664-668), only one of the five countries accused of dumping was found to be injuring the domestic US industry during the preliminary investigation. Similarly, in the 1995 case of polyvinyl alcohol (731-TA-726-729), only three of the four countries accused of dumping were found to be a cause of injury during the preliminary investigation.

<sup>13</sup>This determination is made within 115 days of the USITC's preliminary determination. Therefore, the total elapsed time from initiation to a preliminary measure is 160 days in normal cases.

<sup>14</sup>See, for example, the splits in preliminary dumping determinations in oil country tubular goods in 1994 (731-TA-711-717), stainless steel round wire in 1997 (731-TA-781-786), low enriched uranium in 2000 (731-TA-909-912), and structural steel beams in 2001 (731-TA-935-942).

named in an antidumping case, the second column lists the number of multicountry-cases, the third column lists the number cases in which all the accused countries faced a preliminary antidumping measure, and column 4 lists the number of multicountry cases in which no accused country faced a preliminary antidumping measure. Column 5 reports the number of cases in which some accused countries faced preliminary measures and some did not. Overall, in about 26% of antidumping cases at least one country had a preliminary outcome that was different from its accused peers.

If the preliminary injury investigation found evidence of injury caused by “dumped” imports, the case proceeds to the final phase. In the final phase, the USITC again sends questionnaires to the domestic firms, importers, and foreign firms that reported production and/or imports during the preliminary phase. Final questionnaires request generally the same data as preliminary questionnaires, but are updated with more recent data. One difference with the preliminary investigation is that questionnaires are sent to purchasers of the product requesting data on the value of purchases of the product manufactured domestically, by foreign firms accused of dumping and by other foreign firms. Purchasers are also asked to compare foreign and domestic products in terms of price, quality, service, delivery, etc. The US Department of Commerce makes a final dumping determination according to the price and cost data available. As in the preliminary phase, there is considerable variation across countries in the magnitude of the final duty with Commerce finding no evidence of dumping in some cases. Differences in the magnitudes of preliminary and final dumping margins can arise because more recent data on prices and costs have become available or because data obtained in the final questionnaires may obtain revisions to data obtained in the preliminary questionnaire.

To conclude the final phase of the investigation, the US ITC makes a final injury determination.<sup>15</sup> The USITC generally groups all countries  $j$  that have proceeded to the final phase together in its injury decision, but split decisions are possible if some countries are being investigated for a threat of injury (as opposed to actual injury). If there is evidence of injury and dumping, the government imposes a final antidumping duty.<sup>16</sup> In summary, during the final phase of an inves-

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<sup>15</sup>This determination is made within 120 days of the US DOC’s preliminary dumping determination or 45 days of its final dumping determination, whichever date is later. Consequently, the total elapsed time from initiation of a petition to the final determination can range from 280 to 340 days in normal cases.

<sup>16</sup>See Blonigen and Haynes (2002) and Blonigen and Park (2004) for a detailed discussion of the dynamics of antidumping duties after imposition. Since 1995, GATT rules limit the duration of antidumping measures to 5 years. However, Cadot, de Melo, and Tumurchudur (2007) find that US compliance with the WTO’s sunset review policy is weak at best and likely has had no impact on the duration of US antidumping duties.

tigation, cross-country variation in which countries ultimately face antidumping duties can arise from variation in the outcome of the dumping determination or the injury (or threat of injury) determination.

Table 3 presents evidence on the cross-country variation in final determinations for antidumping cases brought by US manufacturers between 1980 and 2001. The structure of the table is the same as table 2. Again we observe that in the final stage of an antidumping investigation, the government split its decision across countries accused of dumping in one quarter of multi-country cases.

### 3 Empirical Model

To evaluate if foreign economic fluctuations lead to cyclical dumping, I estimate a binary model with selection (Van de Ven and Van Praag (1981)), specifically, a binary model of industry  $i$  petitions for antidumping protection against countries  $j$  and a binary model of the government's decision to impose antidumping measures. The empirical model is a two stage process. In the first stage, in every period  $t$  an industry  $i$  makes a binary decision to file for protection or not to file against each foreign country  $j$  that exports  $i$ 's product to the US. In the second stage, if an industry has filed for protection, the government makes a binary decision of whether or not to impose an antidumping measure against each country  $j$  accused of dumping.

To simplify the analysis, in the second stage, I estimate a binary model of the government's decision to impose a preliminary antidumping measure in which the injury determination by the USITC and the dumping determination by the USDOC are collapsed into a single outcome variable which is affirmative if both agency decisions are affirmative. Similarly, the binary model of the final decision is collapsed into a single outcome variable which is affirmative if there is evidence of both dumping and injury.

In the second stage, the government's latent measure of injury and dumping  $d_{ijt}^*$  is unobserved, but takes the form  $d_{ijt}^* = \beta' x_{ijt} + \varepsilon_{ijt}$  where  $i$  denotes the industry in which dumping is alleged to occur,  $j$  denotes the foreign country accused of dumping, and  $t$  denotes the time period in which the complaint is filed. The variables in  $x_{ijt}$  are described in detail in the next section. In brief, this vector includes a measure of the state of industry demand in both the accused foreign country and in the importing country and lagged measures of injury to the importing country's industry. Although I do not observe the latent measure of injury and dumping, I observe the importing

government's decision of whether ( $d_{ijt} = 1$ ) or not ( $d_{ijt} = 0$ ) to impose antidumping protection conditional on an industry filing for protection.

$$d_{ijt} = \begin{cases} 1 & \text{if } d_{ijt}^* > 0 \\ 0 & \text{if } d_{ijt}^* \leq 0 \end{cases} \quad (1)$$

Assuming  $\varepsilon_{ijt} \sim N(0, 1)$ , then the likelihood for the selected sub-sample is

$$L = \prod_{ijt} [\Phi(\beta' x_{ijt})]^{d_{ijt}} \prod_{ijt} [1 - \Phi(\beta' x_{ijt})]^{(1-d_{ijt})} \quad (2)$$

where the CDF for a normal distribution is denoted by  $\Phi$ .

An antidumping case is only considered by the government if a domestic industry chooses to file a petition for protection. If an industry's decision to apply for protection and the government's decision to grant protection are correlated, then estimates of  $\beta$  will be inconsistent.

In the first stage, the industry's latent measure of selection,  $y_{ijt}^*$ , is unobserved, but takes the form  $y_{ijt}^* = \gamma' z_{ijt} + \nu_{ijt}$ , where  $z_{ijt}$  is a vector that includes a measure of the state of industry demand in the foreign country and foreign and domestic industry characteristics that are predetermined at time  $t$ ;  $(\nu_{ijt}, \varepsilon_{ijt})$  are assumed to be independent of  $(x_{ijt}, z_{ijt})$  and their joint distribution is given by:

$$\begin{bmatrix} \varepsilon_{ijt} \\ \nu_{ijt} \end{bmatrix} \sim N\left(0, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix}\right)$$

The industry's decision to petition ( $y_{ijt} = 1$ ) can be written

$$y_{ijt} = \begin{cases} 1 & \text{if } y_{ijt}^* > 0 \\ 0 & \text{if } y_{ijt}^* \leq 0 \end{cases} \quad (3)$$

Given the preceding assumptions, the expectation of the government's latent variable in the second stage can be written:

$$E(d_{ijt}^* | x_{ijt}, y_{ijt}^* > 0) = E(\beta' x_{ijt} | x_{ijt}, \nu_{ijt} > -\gamma' z_{ijt}) + \rho \frac{\phi(-\gamma' z_{ijt})}{\Phi(\gamma' z_{ijt})} \quad (4)$$

and the government's latent variable is given by:

$$d_{ijt}^* = \beta' x_{ijt} + \rho \frac{\phi(-\gamma' z_{ijt})}{\Phi(\gamma' z_{ijt})} + \tilde{\varepsilon}_{ijt} \quad (5)$$

where  $\tilde{\varepsilon}_{ijt}$  is normally distributed and independent of  $\nu_{ijt}$ ,  $E(\tilde{\varepsilon}_{ijt} | y_{ijt}^* > 0) = 0$  and  $E(\tilde{\varepsilon}_{ijt}^2 | y_{ijt}^* > 0) = 1 - \rho^2 \lambda_{ijt}(-\gamma' z_{ijt} - \lambda_{ijt})$  and where  $\lambda_{ijt} = \phi(-\gamma' z_{ijt}) / \Phi(\gamma' z_{ijt})$ .

Renormalizing  $d_{ijt}^*$  so that the variance of the censored error,  $\tilde{\varepsilon}_{ijt}$ , is equal to one allows us to derive the likelihood for the full model as:

$$L = \prod_{ijt} \left[ \Phi(\beta' x_{ijt}, \gamma' z_{ijt}, \rho) \right]^{d_{ijt} y_{ijt}} \prod_{ijt} \left[ \Phi(-\beta' x_{ijt}, \gamma' z_{ijt}, \rho) \right]^{(1-d_{ijt}) y_{ijt}} \prod_{ijt} \left[ \Phi(-\gamma' z_{ijt}) \right]^{1-y_{ijt}} \quad (6)$$

Identification of the effect of foreign demand strength on filings and outcomes comes from three sources of variation in the  $ijt$  panel data. First, within an industry  $i$  in year  $t$ , there is variation across countries  $j$  both in whether or not they are included in an antidumping petition and in the government's determination of injury and dumping. Second, within a year  $t$ , there is variation across industries  $i$  in filing and protection decisions. Finally, there is intertemporal variation for industry  $i$  and country  $j$  in the timing of petition-filing by industries and the protection decisions by governments.

Marginal effects and predicted joint probabilities derived from coefficient estimates obtained from maximizing the log of the likelihood (6) are reported in tables 6 - 13. The maximum likelihood coefficient estimates are reported in appendix tables C- F.

## 4 Data

I estimate the empirical model using a panel dataset constructed from three main data sources: (1) the World Bank's Trade, Production and Protection Data, (2) the NBER Trade and Manufacturing Databases, and (3) the Global Antidumping Database maintained by Chad Bown. Data on US GDP growth come from the US Bureau of Economic Analysis. Annual bilateral real exchange rates in foreign currency per US dollar come from the USDA Economic Research Service. Summary statistics for all variables in the dataset are reported in table 5.

The focus of the empirical work is quantifying the role that foreign demand shocks play in industry petitioning and the government's decision to impose antidumping protection. The World

Bank's Trade, Production and Protection Data compiled by Alessandro Nicita and Marcelo Olarreaga provides information on output, imports, exports and employment for 28 3 digit ISIC Rev. 2 manufacturing industries from 1980-2001 for 49 developed and developing economies.<sup>17</sup> Because US antidumping duties are imposed against countries and not customs unions or free trade areas, the analysis treats each country of the EU as a separate observation with country-level, rather than Union-level data used in the analysis.

Estimation of the model uses four different proxies for the strength of demand in country  $j$  industry  $i$ : the growth of employment for  $ijt - 1$ , the growth of consumption (output plus imports less exports) for  $ijt - 1$ , detrended employment growth and detrended consumption growth. Although foreign consumption growth would seem to be the best measure to capture fluctuations in foreign demand, the rationale for focusing on foreign employment growth is that we might expect the reported counts of workers to be a relatively high quality variable across a wide spectrum of countries. Moreover, data on industry employment is available for more countries and years. The two detrended growth measures are intended to better capture country and industry-specific demand fluctuations. The detrended variable is defined as employment (consumption) growth in country  $j$  industry  $i$  at  $t - 1$  less the average annual growth rate of employment for country  $j$  industry  $i$  from 1979 (or earliest year available) until 2001. The logged levels of employment and consumption serve as proxies for the size of the foreign industry. Because the current value of these variables could be endogenous to filing behavior by US industries, I use the first lag of all foreign variables in estimating the model.

The NBER Trade and Manufacturing Databases provide data on imports, shipments, prices, employment, real capital stock and value added for about 450 manufacturing industries. These data were concorded to 439 1987 4 digit SIC codes using the industry concordance provided by the NBER-CES Manufacturing Industry Database and the original data from 1979-1994 were extended through 2001. Nominal values of imports and shipments (a measure of domestic output) were

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<sup>17</sup>Countries in the dataset include: Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, China, Columbia, Costa Rica, Denmark, Ecuador, Egypt, El Salvador, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Kenya, South Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Trinidad, Turkey, United Kingdom, and Venezuela. Twenty-two years of disaggregated manufacturing data are available for almost all of the countries in the dataset. Important targets of US antidumping duties with fewer than twenty-two years of available data include: the People's Republic of China (1980-1998), Germany (1992-2001), and Brazil (1993-1996).

deflated to real 1987 dollars using industry specific price indices.

Industry characteristics used to estimate the selection equation include political and economic measures that may affect an industry’s propensity to file but are thought to be unrelated to the government’s determination of dumping. Some industries may be more likely to file for protection than others. For example, large industries may be better able to assume the large legal fixed cost of filing a petition. Industries in which the level of imports relative to total domestic consumption is high may be more familiar with trade protection policies and thus, more likely to file. The vertical structure of an industry may matter; industries that are further downstream may file more petitions because they are more sensitive to industry price changes. Thus, a measure of industry size, the level of employment; the real import penetration ratio (real imports/(real imports + real domestic shipments)); and a proxy for the vertical structure of an industry, the value-added to output ratio are used to estimate the selection equation. The selection equation also includes three measures of injury which US law suggests should be important to the government’s decision; the capacity utilization rate (real shipments/real capital stock), the percent change in the import penetration ratio and the change in employment. Because the current values of industry specific variables and the choice of whether to petition for protection may be endogenous, I use lagged values of these variables in  $z_{ijt}$ .

Data on antidumping cases from 1979 through 2001 come from Global Antidumping Database Version 3.0 compiled by Chad Bown at Brandeis University. The US files in the database provide detailed information on the date a petition was filed, the identity of the country accused of dumping, tariff line information on the products involved, various outcome dates, and the outcomes at different stages of the investigation. The variable on petition filings takes on a value of one if the US industry filed a petition. Using the detailed information on the case outcome, I construct two binary measures of the government’s determination: preliminary decision and final decision. Following Hansen and Prusa (1995), the preliminary (final) decision is coded as affirmative if the US government imposed a preliminary (final) antidumping duty or if the case resulted in a suspension or termination agreement during the preliminary (final) phase.<sup>18</sup>

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<sup>18</sup>In appendix tables A (preliminary duties) and B (final duties) I report results in which suspension and termination agreements were re-coded as negative (no-duty) outcomes. The estimated marginal effects of foreign economic conditions are similar across coding schema although the magnitudes are larger when suspensions and terminations are coded as no-duty outcomes. The robustness across coding schema is likely due to the rarity of suspensions and terminations after the late 1980s.

The three datasets used in the paper provide information on industries at three different levels of aggregation: 3 digit foreign industries, 4 digit US industries, and 5, 7, 8, or 10 digit antidumping *cases*. In order to merge these three datasets together, the 439 4 digit SIC87 manufacturing industries were mapped into 28 ISIC R. 2 manufacturing industries by the author. Similarly, the tariff-line level antidumping case data were also mapped into 439 4 digit SIC87 industries by the author. Because the US and foreign industry data used in the analysis are more aggregated than the industries investigated in antidumping cases, we might expect parameter estimates based on these aggregated variables to underestimate the true effect of domestic and foreign factors on antidumping outcomes.

## 5 Empirical Results

The empirical results summarized in tables 9 and 13 indicate that a weakening of demand in a foreign industry is associated with an increased probability of US antidumping protection. According to the estimates of the empirical model, a one standard deviation fall in foreign demand increases the joint probability that a US industry will seek and the US government will grant a preliminary antidumping measure by a factor of two to three, depending on the measure of foreign demand used. Similarly, a one standard deviation fall in foreign demand increases the joint probability of a filing and a final antidumping measure by a factor of five to seven, depending upon the precise measure. This suggests that the US government might be using antidumping protection to shelter the US economy from cyclical dumping caused by economic weakness in a foreign trading partner.

Tables 6 - 8 report the estimated marginal effects on the probability that an industry  $i$  will file an antidumping petition against country  $j$  in year  $t$  and in the probability that the US government will impose a preliminary antidumping measure. The predicted joint probability of a petition filing and a preliminary antidumping measure associated with a one standard deviation fall in foreign demand is presented in table 9.

Tables 10 - 12 present estimated marginal effects for petition filings and final antidumping measures. Table 13 summarizes these results as the predicted joint probability of a petition filing and a final antidumping measure in response to a one standard deviation fall in foreign demand. Maximum likelihood coefficients for all variables are reported in appendix tables C - F.



## 5.1 Preliminary antidumping measures

Table 6 presents estimates of the two-stage model of the US industry’s filing decision and government’s decision to impose a preliminary antidumping measure. The top panel of table 6 reports the marginal increase in the probability that a US industry will file an antidumping petition associated with changes in measures of foreign demand and the size of the foreign industry. The bottom panel reports the marginal increase in the probability of the US government imposing a preliminary antidumping measure.

Column 1 reports results for the basic specification. A one unit increase in the lagged growth of foreign employment is associated with a 1.2% decrease in the probability that a domestic industry will file an antidumping petition. Evaluated at the sample mean, a one standard deviation fall in lagged foreign employment growth increases the probability that that country’s industry will face an antidumping petition by 0.23 percentage points. This roughly doubles the probability of a filing relative to the unconditional mean filing rate in the sample of 0.20%.

Proceeding to the lower panel of the table, in column 1 a one-unit increase in the growth of foreign employment is associated with a reduction in the probability of an preliminary antidumping measure of 3.8% after controlling for other factors (the lagged employment of the foreign industry, the lagged growth of country-specific import penetration, lagged US GDP growth, and the lagged bilateral exchange rate) and the domestic industry’s first-stage decision to file an antidumping petition. The economic significance is moderate; a one standard deviation fall in foreign employment growth translates into a 0.74 percentage point increase in the probability of an affirmative preliminary decision. Combining estimates from the two stages of the model, the predicted joint probability of a petition filing and a preliminary measure being imposed associated with a one standard deviation fall in lagged foreign employment growth is 0.32%, roughly 2 times the mean joint probability in the sample of 0.14%. Table 9 reports predicted joint probabilities for all specifications.

Moving across the columns of table 6, alternative measures of the strength of foreign demand are employed. Column 2 substitutes the lagged growth of foreign consumption for the lagged growth of employment. The results for the main variable of interest are of the same sign and similar magnitude in the industry filing equation, even though the sample size is reduced by roughly 50,000 observations when this less-available measure of foreign demand is used. On this smaller sample, the coefficient on lagged foreign consumption growth is not significantly different from zero in the government’s decision equation. Table 9 reports that the predicted joint probability of a

petition and a preliminary measure is 0.44% in response to a one standard deviation fall in lagged foreign consumption growth.

This raises a question: are the differences in the estimates presented in columns 1 and 2 due to differences in the measures of foreign demand or due to differences in the estimation samples. The results in column 3 attempt to resolve this. Column 3 repeats the specification 1 on the smaller sample of observations for which the lagged foreign consumption growth variable is available. On this smaller sample, the marginal effect of a change in foreign employment growth is larger in the industry's filing equation, and not significant in the government's decision equation. To assess the quantitative significance of these differences, table 9 reports that the predicted joint probability of a petition and a preliminary measure conditional on a one standard deviation fall in the two measures of foreign demand. For both specifications 2 and 3, the joint probability is 0.44%. This suggests that the differences in estimates across specifications are likely due to the changing sample size rather than in a fundamental difference in what the variables are measuring.

In specification 4, the measure of foreign demand is the actual growth of foreign employment in the year before the antidumping petition was filed less the long-run trend growth of foreign employment in country  $j$ 's industry  $i$ . This detrended measure of foreign employment growth might better capture the country and industry-specific cyclicalities of foreign demand. The results are close in magnitude to those of the basic specification. In table 9 the predicted joint probability of an antidumping measure for this specification is 0.29%, a hair smaller than the predicted probability from specification 1 of 0.32%. Specification 5 repeats this type of analysis by using detrended foreign consumption growth. Again, the estimates are quantitatively similar in size with a predicted joint probability of 0.39% compared to 0.44% from specification 2. Together, columns 4 and 5 indicate that the results are robust to different measures of foreign demand that might better capture country and industry specific cycles.

Appendix tables C and D report the maximum likelihood coefficients for all variables in the joint model of the government's protection decision and the industry's filing decision. The coefficient estimates of US variables (the growth of lagged import penetration, the lagged level of import penetration, the lagged growth of employment in the domestic industry, the lagged level of domestic employment, the lagged level of capacity utilization, the lagged growth of US GDP, and the lagged level of the bilateral real exchange rate) are generally in line with previous research. Interestingly, coefficient estimates reported in appendix table C on the lagged import penetration ratio and the lagged growth of import penetration in the selection equation tell us that (1) consistent with Staiger

and Wolak's (1994) findings, industries with higher import penetration ratios are more likely to seek protection and further, (2) countries with higher import penetration ratios are more likely to be targets of antidumping activity than countries with lower import penetration ratios. However, a shortcoming of the import penetration variable is that it cannot inform us as to whether industries seek (and the US government imposes) antidumping protection because US shipments have fallen or because foreign imports have risen. Thus, the finding that antidumping protection is more likely against a country that is experiencing relatively weak growth in its own industry after controlling for import penetration informs our understanding of why there is variation in the government's policy response to two different countries or industries with similar levels of import penetration. Consistent with the findings of Knetter and Prusa (2003), Feinberg (2005) and Jallab, Sandretto and Gbakou (2006) all of whom estimate negative binomial models of filing rates, a real appreciation of the dollar is associated with an increase in the probability of antidumping filings.

The second to last line of table 6 reports estimates of  $\rho$ , the correlation of the errors from the first and second stage. Estimates of  $\rho$  in table 6 are negative and of roughly the same magnitude across all specifications. A negative selection bias is somewhat surprising. One possible interpretation is that US industries only apply for protection if they are in poor health and think that they might reasonably satisfy the injury criteria. Among this set of poorly-performing industries, the government chooses to protect only the relatively healthy industries with an antidumping measure.

The last row of table 6 reports the loglikelihood. Because the inclusion of different variables changes the estimation sample, it is not feasible to use the loglikelihood to compare fit across all models. However, comparisons can be made between specifications 2 and 3, 1 and 4, and 3 and 5. The differences in model fit, as shown by the loglikelihoods, are small.<sup>19</sup>

Table 7 address the question of whether or not the results from table 6 are driven by particular industries or countries. Japan and China have been frequent country targets of antidumping protection<sup>20</sup> while steel and chemicals are the most cited industries. The estimates in table 7 add country and industry fixed effects to specifications 1-4 to assess the robustness of the results.<sup>21</sup> Es-

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<sup>19</sup>The AIC and BIC for all specifications are reported in appendix table C. As with the loglikelihood criterion, the differences in model fit according to the information criteria are small.

<sup>20</sup>Previous studies (Bown, Crowley, McCulloch, and Nakajima, 2005; Bown and Crowley, 2007; and Bown, 2007) have documented that China's treatment by antidumping authorities is unique; either because of its non-market-economy status, because of the perceived threat of its relatively large export capacity, or for other reasons.

<sup>21</sup>The incidental parameters problem means that the inclusion of country and industry fixed effect could lead to inconsistent estimates if number of fixed effects increases as the number of observations increases. In this application

timates in the fixed effects specifications 6-9 are of the same sign as the specifications without fixed effects (1-4) although the magnitudes of the marginal effects vary. Table 9 presents the quantitative results from table 7 as predicted joint probabilities. In specification 6, the inclusion of country and industry fixed effects yields a larger predicted joint probability of an antidumping measure of 0.51% in response to a one standard deviation fall in foreign employment growth compared to the predicted joint probability of 0.32% for the specification with no fixed effects (1). For consumption growth, specification 7 yields a smaller predicted joint probability of 0.23% when fixed effect are included. Specifications 8 (employment growth on a small sample) and 9 (detrended employment growth) yield predicted joint probabilities of 0.38% and 0.49%. The results from table 7 show that the results are not driven by specific countries or industries. In fact, the effect of a fall in foreign employment growth on the probability of an antidumping measure is larger when country and industry fixed effects are included.

Table 8 presents additional variations of the basic specification. In specification 10, the panel dataset is restricted to the 4 digit SIC87 industries that have filed at least one antidumping petition against any country  $j$  between 1980 and 2001. This specification relies heavily on time series variation for frequent industry users of antidumping to obtain identification. In table 9, a one standard deviation fall in foreign employment growth generates a predicted joint probability of a preliminary antidumping measure of 0.64%, suggesting that cyclical variation in the foreign economy might be even more important in industries that regularly seek antidumping protection. Specification 11 attempts to control for the fact that small exporters are not subject to antidumping duties.<sup>22</sup> This sample drops all country-product-year observations in which a country's share of the US import market is less than 1% of a 4 digit SIC87 industry. After omitting these smaller exporters, the joint probability of a preliminary antidumping measure is 0.92% conditional on a one standard deviation fall in foreign industry employment growth. This is more than twice as large as the joint probability

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with 22 years of data, there is one fixed effect for each of the 49 countries and there are 28 2 digit industry-level fixed effects for the 439 4 digit industries in the sample. Thus, as the number of fixed effects is far less than the number of observations, the extent of the inconsistency might not be too severe. However, the results should be viewed with this in mind.

<sup>22</sup>The WTO's antidumping code states that any country which is the source of less than 3% of the imports of a product that is subject to an antidumping investigation is a "negligible" supplier and cannot be subject to antidumping duties. Because my analysis uses industry definitions at the 4 digit SIC87 level which are more aggregated than the product definitions used in antidumping cases, I restrict the "large exporter" sample to countries with an import market share greater than 1% of the 4 digit industry. Results are robust to modest changes in this definition.

of a filing and preliminary measure in this “large exporter” sample of 0.44%. Finally, specification 12 seeks to identify if antidumping investigations that involve more than one country are more or less likely to face a preliminary antidumping duty than single-country investigations. The estimate on the multicountry case dummy is not statistically significant, suggesting that multicountry cases are not more likely to result in preliminary antidumping measures than single country cases after controlling for other factors. The marginal effect of a foreign demand shock has the same sign and a slightly larger magnitude in both stages of the non-linear model. The predicted joint probability of 0.41% is slightly larger than for the basic specification. Overall, table 8 validates the robustness of the basic results while suggesting that the magnitude of foreign economic shocks is likely larger for industries that regularly seek protection under antidumping law and for important exporting countries.

In summary, weak growth in either employment or consumption in foreign industries is a powerful predictor of a preliminary antidumping measure. After controlling for other economic and political factors including US GDP growth, a one standard deviation fall in the lagged growth of foreign demand increases the probability of a preliminary antidumping measure by a factor of 2 to 3, depending on the precise measure of foreign demand used. In conclusion, temporary US trade policies are applied counter-cyclically to foreign economic fluctuations.

## 5.2 Final antidumping measures

Table 10 presents marginal effects for the model of industry filing and the government’s decision to impose final antidumping measures. A one standard deviation fall in foreign employment growth has a significant positive effect on the probability that a petition will be filed, but is not a statistically significant determinant of the government’s decision to impose final (long-lasting) antidumping measures. Quantitatively, the predicted joint probability of a petition and a final antidumping measure evaluated at the sample mean is 0.52% in response to a one standard deviation fall in foreign employment growth. This is a more than five-fold increase above the underlying joint probability in the sample of 0.09%. See table 13. Substituting in foreign consumption growth (specification 14), using a smaller sample (specification 15), or using detrended employment (specification 16) or consumption growth (specification 17) as the measure of foreign demand generate broadly consistent results. The strength of foreign demand is an important determinant of filing behavior, but not of the government’s decision. In table 13, the predicted joint probabilities of a petition and a final measure are 0.69%, 0.56%, 0.48% and 0.49% for specifications 14-17, respectively.

It is not clear why the measures of foreign demand are not significant determinants in the government's final decision. One possibility is that new data might become available to policy makers between the time of the preliminary and final decision. However, because the overwhelming majority of preliminary and final decisions are made within the same calendar year, there is not enough variation in the sample to examine this with annual data.<sup>23</sup>

As with preliminary measures, the coefficient estimates for other variables are generally in line with previous research. Maximum likelihood coefficient estimates for all variables are reported in appendix tables E and F. The estimated correlation coefficient is negative in all specifications.

Table 11 adds country and 2-digit industry fixed effects to four of the specifications in table 10. Across the board, the inclusion of the fixed effects leads to larger marginal effects of the measure of foreign demand on the probability of filing an final antidumping petition. This translates into large increases in the predicted joint probability of a petition filing and a final measure imposed. See table 13. A one standard deviation fall in foreign employment growth (specification 18) yields a predicted joint probability of 0.90%, a ten-fold increase over the sample's joint probability of 0.09%. Similarly, a one standard deviation fall in foreign consumption growth (specification 19) yields a predicted joint probability of 1.00%.

Finally, table 12 reports three addition specifications. Column 22 presents estimates obtained from a sample restricted to 4 digit SIC87 industries that filed at least one antidumping petition during the sample period. Again, the sign of the marginal effect of foreign employment growth is the same as that of the basic specification 13 reported in table 10. Quantitatively, table 13 reports a one standard deviation fall in lagged foreign employment growth increases the joint probability of a filing and a final measure to 0.71%. Specification 23 restricts the sample to large exporters as defined above. Within this sample of large exporters, a one standard deviation fall in lagged foreign employment growth increases the joint probability of a filing and a final measure to 0.45% from a mean in this sample of 0.27%. Specification 24 adds a multicountry case dummy to the government's decision rule and yields an estimate of the joint probability of a filing and a final measure associated with a one standard deviation fall in lagged foreign employment growth of 0.55%.

To summarize tables 10 - 12, economic weakness in foreign industries is a strong predictor of

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<sup>23</sup>Estimating the model with the data lagged from the date of the final decision rather than the petition filing yielded no notable changes. Because most cases are completed in one calendar year, this alternative lagging structure yielded few changes relative to the basic data sample.

final antidumping measures. However, the mechanism by which these variables influence the outcome is different for final (long-lasting) antidumping duties and preliminary (temporary) measures. While measures of economic weakness in a foreign industry directly impact both the government's preliminary antidumping decision rule and the domestic industry's filing rule, for final antidumping duties, measures of foreign demand only affect the ultimate outcome through the domestic industry's filing decision. Depending on the exact specification of the model, a one standard deviation fall in foreign demand can increase by a factor of 10 the joint probability that an industry will file an antidumping petition and the US government will impose a final antidumping duty.

### 5.2.1 Robustness

In appendix tables A and B, I check the robustness of these results against an alternative definition of the dependent variables. Appendix table A (appendix table B) reports results in which the dependent variable is coded 1 if the US government imposed a preliminary (final) duty and 0 if the petition resulted in no duty *or a suspension or termination agreement*. This coding presumes that negotiated suspension and termination agreements have a less trade-restricting effect than duties.<sup>24</sup>

Specifications 25-29 re-estimate the preliminary investigation models of specifications 1-5 with the alternative dependent variable. In all specifications, the marginal effect of the foreign demand variable has the same sign but a larger magnitude when suspension and termination agreements are coded as a negative outcome.

For final antidumping investigations, the results are similar. Coding suspension and termination agreements as negative outcomes of the final antidumping process yields marginal effects of foreign demand in specifications 30-34 than are roughly equal or larger in magnitude than those in specifications 13-17.

The broad consistency of the results across coding schema is not surprising given the rarity of suspension or termination agreements in the sample that extends from 1980 through 2001.

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<sup>24</sup>Hansen and Prusa's (1988) work on the trade-restricting effects of non-duty outcomes like suspension and terminations agreement provided the support for coding suspension and termination agreements as affirmative antidumping measures in tables 6 - 13.

## 6 Conclusion

This paper exploits cross-country, cross-industry and intertemporal variation in manufacturing employment and consumption growth to identify the relationship between economic weakness in a foreign economy and the probability of antidumping protection. After controlling for other economic and political variables including US GDP growth, I find that a one standard deviation fall in the growth of employment (consumption) in a foreign economy's manufacturing industry doubles (triples) the joint probability that the US industry will file an antidumping petition and the US government will impose a preliminary (temporary) antidumping measure. Further, a one standard deviation fall in foreign employment (consumption) growth increases the joint probability that a petition will be filed and a final (long-lasting) antidumping measure will be imposed by a factor of five (seven). While earlier research by Knetter and Prusa (2003) showed that antidumping protection is applied counter-cyclically with regard to the domestic business cycle, this paper provides the first evidence that I am aware of that US trade policy is applied counter-cyclically to foreign economic fluctuations.



Figure 1: Mean employment growth in industry  $i$  country  $j$  in the year before an antidumping petition is filed

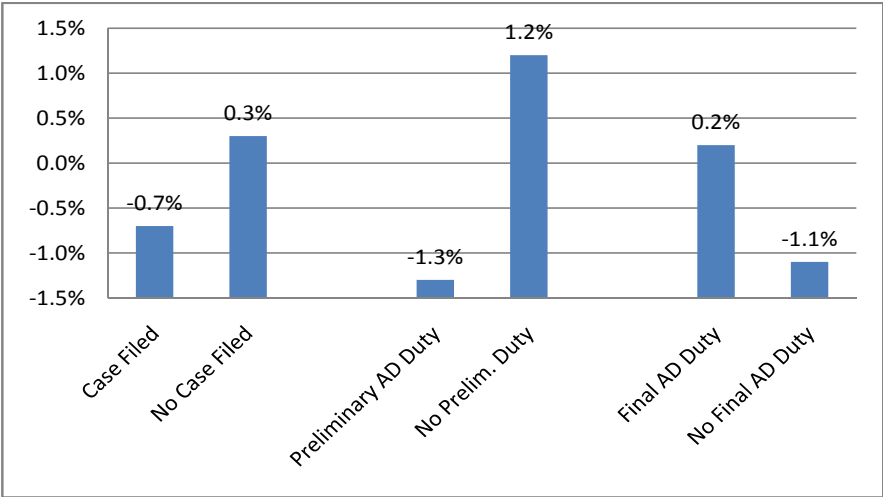


Figure 2: Mean consumption growth in industry  $i$  country  $j$  in the year before an antidumping petition is filed

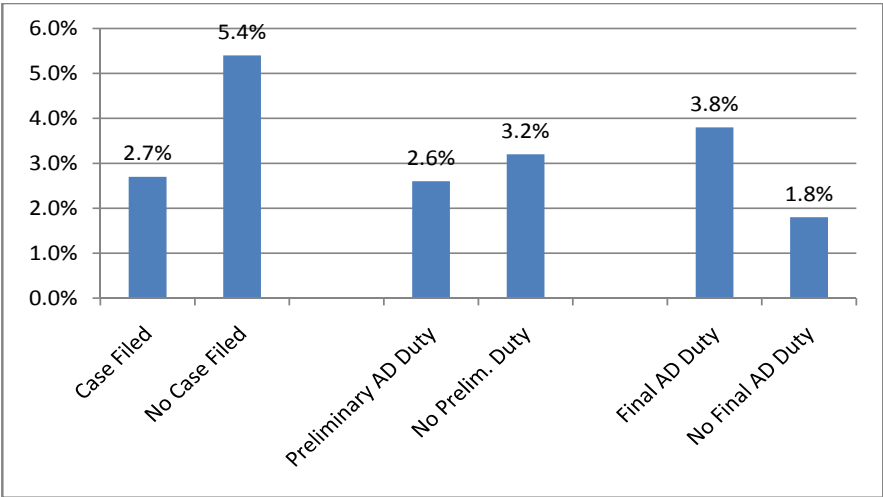


Table 1: Accusations of dumping: US Manufacturing 1980-2001

<b>Industry <math>i</math> makes accusation of dumping at <math>t</math></b>	
Country $j$ exports $i$ to US at $t$ and is...	
accused of dumping	545
not accused	8017
<b>Industry <math>i</math> makes no accusation of dumping at <math>t</math></b>	
Country $j$ exports $i$ to US at $t$ and is...	
not accused	264,077

Table 2: Cross-country variation in prelim. antidumping outcome: 1980-2001

No. of countries named in case	Number of cases	Affirm. Cases	Negative Cases	Split Cases
1	186	138	48	0
2	65	43	10	12
3	18	8	5	5
4	14	8	5	1
5	8	5	0	3
6	4	3	0	1
7	5	2	1	2
8	1	0	0	1
12	1	0	1	0
Total	302	207	70	25

Table 3: Cross-country variation in final antidumping outcome: 1980-2001

No. of countries named in case	Number of cases	Affirm. Cases	Negative Cases	Split Cases
1	186	80	106	0
2	65	28	25	12
3	18	7	6	5
4	14	5	4	4
5	8	4	2	2
6	4	2	1	1
7	5	0	4	1
8	1	0	1	0
12	1	0	1	0
Total	302	126	150	25

Table 4: 49 countries included in the dataset

Argentina	Costa Rica	Hungary	Mexico	Spain
Australia	Denmark	India	Netherlands	Sweden
Austria	Ecuador	Indonesia	New Zealand	Switzerland
Bangladesh	Egypt	Ireland	Norway	Taiwan
Belgium	El Salvador	Israel	Peru	Thailand
Brazil	Finland	Italy	Philippines	Trinidad
Canada	France	Japan	Poland	Turkey
Chile	Germany	Kenya	Portugal	U. Kingdom
China	Greece	South Korea	Singapore	Venezuela
Columbia	Hong Kong	Malaysia	South Africa	

Table 5: Summary Statistics

	Mean	Std. Dev.
<b>Dependent Variables</b>		
Preliminary Measure= 1 petition filed	0.739	0.439
Final Measure= 1 petition filed	0.459	0.499
Petition Filed	0.0020	0.0447
<b>Measures of foreign industry demand</b>		
Growth Foreign Employment $_{ijt-1}$	0.003	0.195
Growth Foreign Consumption $_{ijt-1}$	0.053	0.283
Growth Foreign Employ $_{ijt-1}$ - Trend $_{ij}$	0.001	0.188
Growth Foreign Consump $_{ijt-1}$ - Trend $_{ij}$	0.003	0.275
<b>Measures of foreign market size</b>		
Ln Level of Foreign Employment $_{ijt-1}$	10.572	1.703
Ln Level of Foreign Consumption $_{ijt-1}$	14.867	1.778
<b>Domestic Industry Variables</b>		
Growth US Employment $_{it-1}$	-0.014	0.095
Ln US Employment $_{it-1}$	3.202	1.031
Capacity Utilization $_{it-1}$	2.765	1.743
ValueAdded/Output $_{it-1}$	0.505	0.119
<b>Foreign*Domestic Industry Variables</b>		
Growth Import Penetration $_{ijt-1}$	0.088	1.118
Import Penetration $_{ijt-1}$	0.006	0.026
Number of Observations	272639	

Table 6: Estimates of marginal effects for preliminary decisions

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (2) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consumption growth as foreign demand shock
	(1)	(2)	(3)	(4)	(5)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.012*** (0.004)		-0.023*** (0.004)		
Growth of foreign consumption_ijt-1		-0.014** (0.006)			
Detrended growth of foreign employment_ijt-1				-0.010** (0.004)	
Detrended growth of foreign consumption_ijt-1					-0.012** (0.006)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.008*** (0.001)		0.009*** (0.001)	0.007*** (0.000)	
Ln foreign consumption_ijt-1		0.009*** (0.001)			0.009*** (0.001)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.038* (0.023)		-0.040 (0.031)		
Growth of foreign consumption_ijt-1		0.000 (0.015)			
Detrended growth of foreign employment_ijt-1				-0.042* (0.022)	
Detrended growth of foreign consumption_ijt-1					-0.003 (0.015)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.003 (0.003)		0.004 (0.003)	0.003 (0.002)	
Ln foreign consumption_ijt-1		0.002 (0.004)			0.002 (0.004)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545	443
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.025** (0.012)	-0.027* (0.015)	-0.029* (0.015)	-0.024** (0.011)	-0.027* (0.015)
<b>Log Likelihood</b>	-3616.14	-2952.25	-2937.34	-3616.09	-2953.45

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Table 7: Estimates of marginal effects for preliminary decisions: Country and industry fixed effects

	Add country and industry fixed effects to col. (1)	Add country and industry fixed effects to col. (2)	Add country and industry fixed effects to col. (3)	Add country and industry fixed effects to col. (4)
	(6)	(7)	(8)	(9)
<b>Stage 1: Industry's filing decision</b>				
<b>Measures of foreign demand</b>				
Growth of foreign employment_ijt-1	-0.025** (0.01)		-0.018*** (0.005)	
Growth of foreign consumption_ijt-1		-0.004** (0.002)		
Detrended growth of foreign employment_ijt-1				-0.024** (0.011)
<b>Measures of foreign market size</b>				
Ln foreign employment_ijt-1	0.019*** (0.002)		0.008*** (0.001)	0.018*** (0.002)
Ln foreign consumption_ijt-1		0.001*** (0.001)		
<b>Other control variables</b>	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>				
<b>Measures of foreign demand</b>				
Growth of foreign employment_ijt-1	-0.104* (0.059)		-0.044 (0.031)	
Growth of foreign consumption_ijt-1		0.002 (0.006)		
Detrended growth of foreign employment_ijt-1				-0.101* (0.058)
<b>Measures of foreign market size</b>				
Ln foreign employment_ijt-1	0.014 (0.01)		0.012** (0.006)	0.013 (0.009)
Ln foreign consumption_ijt-1		0.004** (0.002)		
<b>Other control variables</b>	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545
<b>Number of Observations</b>	272639	228830	227849	272639
<b>Rho</b>	-0.033 (0.032)	-0.009 (0.007)	-0.018 (0.018)	-0.033 (0.031)
<b>Log Likelihood</b>	-3275.13	-2686.58	-2658.41	-3275.24

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Table 8: Estimates of marginal effects for preliminary decisions: Additional specifications

	Restrict col. (1) sample to industries with antidumping filers (10)	Restrict col. (1) sample to large exporters (11)	Add a multi-country case dummy to basic spec. in col. (1) (12)
<b><u>Stage 1: Industry's filing decision</u></b>			
<b>Measures of foreign demand</b>			
Growth of foreign employment_ijt-1	-0.010*** (0.003)	-0.111*** (0.034)	-0.018*** (0.006)
<b>Measures of foreign market size</b>			
Ln foreign employment_ijt-1	0.006*** (0.000)	0.025*** (0.005)	0.012*** (0.001)
<b>Other control variables</b>	yes	yes	yes
<b><u>Stage 2: Government's preliminary decision</u></b>			
<b>Measures of foreign demand</b>			
Growth of foreign employment_ijt-1	-0.022 (0.016)	-0.361** (0.183)	-0.057* (0.034)
<b>Measures of foreign market size</b>			
Ln foreign employment_ijt-1	0.001 (0.002)	0.032 (0.021)	0.005 (0.004)
<b>Other control variables</b>	yes	yes	yes
<b>Number of uncensored observations</b>	545	379	545
<b>Number of Observations</b>	82905	62850	272639
<b>Rho</b>	-0.025** (0.012)	0.034 (0.196)	-0.037** (0.018)
<b>Log Likelihood</b>	-3217.43	-2239.96	-3615.84

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.



Table 9: Predicted joint probability of a petition filing and a preliminary antidumping measure for a one s.d. fall in foreign demand

Spec.	Measure of foreign demand	Description	Predicted joint probability of a filing and a preliminary measure conditional on a one std. dev. fall in foreign demand
(1)	Employment growth	Basic specification	0.32%
(2)	Consumption growth	Basic specification	0.44%
(3)	Employment growth	Basic on spec . (2) sample	0.44%
(4)	Detrended employ. growth	Basic specification	0.29%
(5)	Detrended consump. growth	Basic specification	0.39%
(6)	Employment growth	Country & Industry F.E.s	0.51%
(7)	Consumption growth	Country & Industry F.E.s	0.23%
(8)	Employment growth	Country & Industry F.E.s	0.38%
(9)	Detrended employ. growth	Country & Industry F.E.s	0.49%
(10)	Employment growth	Restrict spec. (1) sample to industries with antidumping filers	0.64%
(11)	Employment growth	Restrict spec. (1) sample to large exporters	0.92%
(12)	Employment growth	Add a multi-country case dummy to spec. (1)	0.41%

Table 10: Estimates of marginal effects for final decisions

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (14) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consumption growth as foreign demand shock
	(13)	(14)	(15)	(16)	(17)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.048*** (0.017)		-0.059*** (0.011)		
Growth of foreign consumption_ijt-1		-0.046** (0.019)			
Detrended growth of foreign employment_ijt-1				-0.045** (0.019)	
Detrended growth of foreign consumption_ijt-1					-0.039** (0.02)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.032*** (0.002)		0.024*** (0.002)	0.032*** (0.002)	
Ln foreign consumption_ijt-1		0.031*** (0.002)			0.031*** (0.002)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	0.017 (0.073)		0.033 (0.063)		
Growth of foreign consumption_ijt-1		0.036 (0.055)			
Detrended growth of foreign employment_ijt-1				-0.008 (0.077)	
Detrended growth of foreign consumption_ijt-1					0.027 (0.058)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.016 (0.01)		0.007 (0.008)	0.016* (0.01)	
Ln foreign consumption_ijt-1		0.010 (0.012)			0.011 (0.012)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545	443
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.095** (0.042)	-0.089* (0.048)	-0.084** (0.035)	-0.095** (0.042)	-0.090* (0.048)
<b>Log Likelihood</b>	-3678.159	-2987.146	-2973.175	-3678.728	-2988.404

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Table 11: Estimates of marginal effects for final decisions: Country and industry fixed effects

	Add country and industry fixed effects to col. (13)	Add country and industry fixed effects to col. (14)	Add country and industry fixed effects to col. (15)	Add country and industry fixed effects to col. (16)
	(18)	(19)	(20)	(21)
<b>Stage 1: Industry's filing decision</b>				
<b>Measures of foreign demand</b>				
Growth of foreign employment_ijt-1	-0.091** (0.038)		-0.103*** (0.027)	
Growth of foreign consumption_ijt-1		-0.070** (0.032)		
Detrended growth of foreign employment_ijt-1				-0.087** (0.039)
<b>Measures of foreign market size</b>				
Ln foreign employment_ijt-1	0.068*** (0.009)		0.047*** (0.007)	0.066*** (0.008)
Ln foreign consumption_ijt-1		0.025*** (0.009)		
<b>Other control variables</b>	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>				
<b>Measures of foreign demand</b>				
Growth of foreign employment_ijt-1	-0.073 (0.164)		-0.045 (0.138)	
Growth of foreign consumption_ijt-1		0.132 (0.109)		
Detrended growth of foreign employment_ijt-1				-0.098 (0.158)
<b>Measures of foreign market size</b>				
Ln foreign employment_ijt-1	0.047 (0.034)		0.058* (0.031)	0.052 (0.033)
Ln foreign consumption_ijt-1		0.029 (0.036)		
<b>Other control variables</b>	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545
<b>Number of Observations</b>	272639	228830	227849	272639
<b>Rho</b>	-0.059 (0.101)	-0.024 (0.106)	0.003 (0.088)	-0.041 (0.096)
<b>Log Likelihood</b>	-3338.728	-2720.634	-2690.771	-3339.516

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Table 12: Estimates of marginal effects for final decisions: Additional specifications

	Restrict col. (13) sample to industries with antidumping filers (22)	Restrict col. (13) sample to large exporters (23)	Add a multi-country case dummy to basic specif. in col. (13) (24)
<b><u>Stage 1: Industry's filing decision</u></b>			
<b>Measures of foreign demand</b>			
Growth of foreign employment_ijt-1	-0.045*** (0.015)	-0.023*** (0.007)	-0.051*** (0.018)
<b>Measures of foreign market size</b>			
Ln foreign employment_ijt-1	0.028*** (0.002)	0.005*** (0.001)	0.034*** (0.002)
<b>Other control variables</b>	yes	yes	yes
<b><u>Stage 2: Government's preliminary decision</u></b>			
<b>Measures of foreign demand</b>			
Growth of foreign employment_ijt-1	0.021 (0.059)	0.017 (0.026)	0.017 (0.079)
<b>Measures of foreign market size</b>			
Ln foreign employment_ijt-1	0.008 (0.009)	0.004 (0.004)	0.019* (0.011)
<b>Other control variables</b>	yes	yes	yes
<b>Number of uncensored observations</b>	545	379	545
<b>Number of Observations</b>	82905	62850	272639
<b>Rho</b>	-0.103** (0.048)	-0.061* (0.033)	-0.101** (0.045)
<b>Log Likelihood</b>	-3279.807	-2290.329	-3676.879

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Table 13: Predicted joint probability of a petition filing and a final antidumping measure for a one s.d. fall in foreign demand

Spec.	Measure of foreign demand	Description	Predicted joint probability of a filing and a final measure conditional on a one std. dev. fall in foreign demand
(13)	Employment growth	Basic specification	0.52%
(14)	Consumption growth	Basic specification	0.69%
(15)	Employment growth	Basic on spec . (14) sample	0.56%
(16)	Detrended employ. growth	Basic specification	0.48%
(17)	Detrended consump. growth	Basic specification	0.49%
(18)	Employment growth	Country & Industry F.E.s	0.90%
(19)	Consumption growth	Country & Industry F.E.s	1.00%
(20)	Employment growth	Country & Industry F.E.s	0.91%
(21)	Detrended employ. growth	Country & Industry F.E.s	0.84%
(22)	Employment growth	Restrict spec. (13) sample to industries with antidumping filers	0.71%
(23)	Employment growth	Restrict spec. (13) sample to large exporters	0.45%
(24)	Employment growth	Add a multi-country case dummy to spec. (13)	0.55%

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Appendix Table A: Estimates of marginal effects for a preliminary antidumping duty

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (26) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consumption growth as foreign demand shock
	(25)	(26)	(27)	(28)	(29)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.016*** (0.006)		-0.028*** (0.005)		
Growth of foreign consumption_ijt-1		-0.017** (0.007)			
Detrended growth of foreign employment_ijt-1				-0.013** (0.006)	
Detrended growth of foreign consumption_ijt-1					-0.014** (0.007)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.011*** (0.001)		0.011*** (0.001)	0.009*** (0.001)	
Ln foreign consumption_ijt-1		0.011*** (0.001)			0.011*** (0.001)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.055* (0.03)		-0.050 (0.037)		
Growth of foreign consumption_ijt-1		-0.002 (0.019)			
Detrended growth of foreign employment_ijt-1				-0.063** (0.029)	
Detrended growth of foreign consumption_ijt-1					-0.004 (0.019)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.005 (0.003)		0.005 (0.004)	0.004 (0.003)	
Ln foreign consumption_ijt-1		0.003 (0.004)			0.003 (0.004)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545	443
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.029* (0.016)	-0.031* (0.018)	-0.032* (0.018)	-0.028** (0.014)	-0.031* (0.019)
<b>Log Likelihood</b>	-3619.513	-2954.253	-2939.382	-3619.192	-2955.446

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Appendix Table B: Estimates of marginal effects for a final antidumping duty

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (31) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consumption growth as foreign demand shock
	(30)	(31)	(32)	(33)	(34)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.047*** (0.016)		-0.068*** (0.013)		
Growth of foreign consumption_ijt-1		-0.052** (0.021)			
Detrended growth of foreign employment_ijt-1				-0.044** (0.019)	
Detrended growth of foreign consumption_ijt-1					-0.044** (0.022)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.031*** (0.002)		0.028*** (0.002)	0.031*** (0.002)	
Ln foreign consumption_ijt-1		0.035*** (0.003)			0.035*** (0.003)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	0.018 (0.072)		0.038 (0.074)		
Growth of foreign consumption_ijt-1		0.042 (0.062)			
Detrended growth of foreign employment_ijt-1				-0.003 (0.076)	
Detrended growth of foreign consumption_ijt-1					0.037 (0.064)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.014 (0.01)		0.007 (0.009)	0.014 (0.01)	
Ln foreign consumption_ijt-1		0.011 (0.013)			0.011 (0.013)
<b>Other control variables</b>	yes	yes	yes	yes	yes
<b>Number of uncensored observations</b>	545	443	441	545	443
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.093** (0.041)	-0.090* (0.053)	-0.087** (0.041)	-0.093** (0.042)	-0.090* (0.053)
<b>Log Likelihood</b>	-3679.57	-2988.10	-2974.43	-3680.16	-2989.33

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels. Other control variables in the stage 2: government decision include: the growth of import penetration\_ijt-1, the growth of domestic employment\_it-1, capacity utilization\_it-1, the growth of US GDP\_t-1, and the bilateral real exchange rate between the dollar and country j's currency\_t-1. Other control variables in the stage 1: Industry filing decision include all controls in the stage 2 decision plus import penetration\_ijt-1, the logged level of domestic employment\_it-1, and value added/output\_it-1.

Appendix Table C: ML coefficient estimates for table 6: Stage 1

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (2) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consump. growth as foreign demand shock
	(1)	(2)	(3)	(4)	(5)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.211*** (0.073)		-0.337*** (0.066)		
Growth of foreign consumption_ijt-1		-0.208** (0.086)			
Detrended growth of foreign emp_ijt-1				-0.195** (0.083)	
Detrended growth of foreign cons_ijt-1					-0.176** (0.088)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.139*** (0.009)		0.140*** (0.010)	0.138*** (0.009)	
Ln foreign consumption_ijt-1		0.139*** (0.010)			0.139*** (0.010)
<b>Industry-level control variables</b>					
Growth of country j's import pen_ijt-1	0.026*** (0.009)	0.033*** (0.011)	0.028** (0.011)	0.026*** (0.009)	0.033*** (0.011)
Import penetration_ijt-1	2.576*** (0.154)	2.786*** (0.181)	2.675*** (0.180)	2.574*** (0.154)	2.783*** (0.181)
Growth of domestic employment_it-1	0.165 (0.164)	0.273 (0.184)	0.324* (0.178)	0.162 (0.164)	0.269 (0.184)
Ln(employment)_ijt-1	0.263*** (0.014)	0.257*** (0.015)	0.262*** (0.015)	0.263*** (0.014)	0.257*** (0.015)
Capacity utilization_it-1	-0.343*** (0.034)	-0.356*** (0.038)	-0.369*** (0.038)	-0.344*** (0.034)	-0.357*** (0.038)
Value added/output_it-1	-1.593*** (0.136)	-1.493*** (0.145)	-1.608*** (0.153)	-1.599*** (0.135)	-1.501*** (0.144)
<b>Macroeconomic control variables</b>					
Growth of US GDP_t-1	2.192*** (0.824)	0.649 (0.954)	1.116 (0.912)	2.195*** (0.824)	0.663 (0.956)
Ln (bilateral real exchange rate)_jt-1	0.032*** (0.005)	0.042*** (0.006)	0.034*** (0.006)	0.032*** (0.005)	0.041*** (0.006)
<b>Constant</b>	-4.012*** (0.147)	-4.607*** (0.199)	-3.950*** (0.161)	-4.000*** (0.147)	-4.601*** (0.199)
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.435** (0.213)	-0.417* (0.231)	-0.432* (0.224)	-0.457** (0.210)	-0.415* (0.231)
<b>Log Likelihood</b>	-3616.14	-2952.25	-2937.34	-3616.09	-2953.45
<b>AIC</b>	7272.283	5944.499	5914.671	7272.180	5946.892
<b>BIC</b>	7482.601	6151.313	6121.400	7482.499	6153.706

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels.

Appendix Table D: ML coefficient estimates for table 6: Stage 2

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (2) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consump. growth as foreign demand shock
	(1)	(2)	(3)	(4)	(5)
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.649* (0.389)		-0.589 (0.452)		
Growth of foreign consumption_ijt-1		-0.005 (0.227)			
Detrended growth of foreign emp_ijt-1				-0.807* (0.419)	
Detrended growth of foreign cons_ijt-1					-0.038 (0.231)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.057 (0.045)		0.056 (0.049)	0.054 (0.044)	
Ln foreign consumption_ijt-1		0.028 (0.054)			0.029 (0.054)
<b>Industry-level control variables</b>					
Growth of country j's import pen_ijt-1	-0.001 (0.079)	0.034 (0.095)	0.032 (0.088)	-0.003 (0.079)	0.034 (0.095)
Growth of domestic employment_it-1	-1.263 (0.795)	-0.781 (0.908)	-0.684 (0.897)	-1.254 (0.791)	-0.789 (0.910)
Capacity utilization_it-1	0.263*** (0.097)	0.283*** (0.109)	0.272** (0.110)	0.265*** (0.096)	0.282** (0.110)
<b>Macroeconomic control variables</b>					
Growth of US GDP_t-1	2.346 (2.812)	1.481 (3.160)	1.982 (3.210)	2.346 (2.784)	1.479 (3.162)
Ln (bilateral real exchange rate)_jt-1	-0.006 (0.023)	-0.002 (0.025)	0.001 (0.024)	-0.008 (0.023)	-0.002 (0.025)
<b>Constant</b>	0.557 (0.828)	0.654 (1.189)	0.479 (0.873)	0.644 (0.805)	0.642 (1.189)
<b>Number of Uncensored Obs.</b>	545	443	441	545	443

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels.

Appendix Table E: ML coefficient estimates for table 10: Stage 1

	Basic specific. (13)	Substitute foreign consump. growth (14)	Basic spec. on col. (14) sample (15)	Detrended foreign employment growth as foreign demand shock (16)	Detrended foreign consump. growth as foreign demand shock (17)
<b>Stage 1: Industry's filing decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	-0.211*** (0.074)		-0.338*** (0.066)		
Growth of foreign consumption_ijt-1		-0.208** (0.086)			
Detrended growth of foreign emp_ijt-1				-0.195** (0.083)	
Detrended growth of foreign cons_ijt-1					-0.176** (0.088)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.139*** (0.009)		0.140*** (0.010)	0.138*** (0.009)	
Ln foreign consumption_ijt-1		0.139*** (0.010)			0.139*** (0.010)
<b>Industry-level control variables</b>					
Growth of country j's import pen_ijt-1	0.026*** (0.009)	0.033*** (0.011)	0.028** (0.011)	0.026*** (0.009)	0.033*** (0.011)
Import penetration_ijt-1	2.564*** (0.153)	2.762*** (0.180)	2.652*** (0.178)	2.562*** (0.153)	2.759*** (0.180)
Growth of domestic employment_it-1	0.167 (0.164)	0.275 (0.184)	0.327* (0.178)	0.163 (0.164)	0.271 (0.184)
Ln(employment)_ijt-1	0.262*** (0.014)	0.256*** (0.015)	0.261*** (0.015)	0.262*** (0.014)	0.256*** (0.015)
Capacity utilization_it-1	-0.343*** (0.034)	-0.356*** (0.037)	-0.369*** (0.038)	-0.344*** (0.034)	-0.357*** (0.038)
Value added/output_it-1	-1.608*** (0.134)	-1.517*** (0.144)	-1.636*** (0.151)	-1.613*** (0.134)	-1.525*** (0.143)
<b>Macroeconomic control variables</b>					
Growth of US GDP_t-1	2.194*** (0.824)	0.655 (0.953)	1.121 (0.911)	2.196*** (0.824)	0.669 (0.955)
Ln (bilateral real exchange rate)_jt-1	0.032*** (0.005)	0.042*** (0.006)	0.034*** (0.006)	0.032*** (0.005)	0.041*** (0.006)
<b>Constant</b>	-4.004*** (0.148)	-4.594*** (0.20)	-3.935*** (0.162)	-3.992*** (0.147)	-4.589*** (0.20)
<b>Number of Observations</b>	272639	228830	227849	272639	228830
<b>Rho</b>	-0.419** (0.186)	-0.403* (0.215)	-0.480** (0.202)	-0.417** (0.184)	-0.400* (0.214)
<b>Log Likelihood</b>	-3678.159	-2987.146	-2973.175	-3678.728	-2988.404
<b>AIC</b>	7396.319	6014.293	5986.35	7397.455	6016.807
<b>BIC</b>	7606.637	6221.107	6193.079	7607.773	6223.622

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels.

Appendix Table F: ML coefficient estimates for table 10: Stage 2

	Basic specific.	Substitute foreign consump. growth	Basic spec. on col. (14) sample	Detrended foreign employment growth as foreign demand shock	Detrended foreign consump. growth as foreign demand shock
	(13)	(14)	(15)	(16)	(17)
<b>Stage 2: Government's preliminary decision</b>					
<b>Measures of foreign demand</b>					
Growth of foreign employment_ijt-1	0.077 (0.322)		0.189 (0.362)		
Growth of foreign consumption_ijt-1		0.160 (0.250)			
Detrended growth of foreign emp_ijt-1				-0.033 (0.336)	
Detrended growth of foreign cons_ijt-1					0.121 (0.257)
<b>Measures of foreign market size</b>					
Ln foreign employment_ijt-1	0.069 (0.044)		0.041 (0.047)	0.071* (0.043)	
Ln foreign consumption_ijt-1		0.047 (0.052)			0.048 (0.052)
<b>Industry-level control variables</b>					
Growth of country j's import pen_ijt-1	-0.170* (0.088)	-0.162* (0.087)	-0.176** (0.088)	-0.171* (0.088)	-0.162* (0.087)
Growth of domestic employment_it-1	0.277 (0.753)	0.285 (0.887)	0.338 (0.847)	0.292 (0.753)	0.295 (0.888)
Capacity utilization_it-1	0.123 (0.077)	0.170* (0.090)	0.183** (0.085)	0.122 (0.076)	0.170* (0.090)
<b>Macroeconomic control variables</b>					
Growth of US GDP_t-1	2.316 (2.623)	3.840 (3.023)	3.924 (2.992)	2.382 (2.623)	3.850 (3.027)
Ln (bilateral real exchange rate)_jt-1	0.026 (0.021)	0.035 (0.023)	0.034 (0.023)	0.027 (0.021)	0.036 (0.023)
<b>Constant</b>	-0.113 (0.801)	-0.254 (1.202)	0.192 (0.845)	-0.142 (0.791)	-0.274 (1.203)
<b>Number of Uncensored Obs.</b>	545	443	441	545	443

Notes: Huber-White robust std errors in parentheses with \*\*\*, \*\*, and \* indicating statistical significance at the 1%, 5% and 10% levels.