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TARIFF-JUMPING ANTIDUMPING DUTIES

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ABSTRACT

Using a newly constructed database, this paper examines the tariff-jumping response of all firm and product combinations subject to U.S. AD investigations from 1980-1990. The results strongly support the hypothesis that tariff-jumping is only a realistic option for multinational firms from industrialized countries. Because many firms subject to U.S. AD investigations and eventual duties do not have these characteristics, tariff-jumping of U.S. AD protection is relatively modest. It may also explain why developing countries have been more concerned about addressing AD protection in the WTO than industrialized countries. While the raw numbers show a high tariff-response rate for Japanese firms, this is due almost solely to the fact that many of these firms have substantial multinational experience, not due to any Japanese-specific response *per se*. I also find little evidence that certain U.S. Department of Commerce procedures that use information from the domestic petitioners (rather than the foreign firms) to calculate dumping margins has any impact on tariff-jumping responses.

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1. Introduction

In August 1993, Eastman Kodak Company (Kodak) filed a U.S. antidumping (AD) petition against U.S. imports of photographic paper originating from plants owned by Fuji Photo Film (Fuji) in Japan and the Netherlands. By October of 1993, preliminary decisions in the case had found dumping margins of over 300% against the Fuji plants and ruled that the imports were injuring the domestic industry. While this led to an ensuing suspension agreement that led to substantially lower imports for a brief period, Fuji soon located a photographic paper manufacturing plant to the United States that was operational by March 1996. As reported by Komuro (1998), less than a year after its U.S. plant opening, Fuji's share of the U.S. photographic paper market had surpassed the market share Fuji had enjoyed before the U.S. AD petition was filed by Kodak.

The above is an example of foreign direct investment (FDI) motivated by avoiding a trade protection barrier, or more commonly, tariff-jumping FDI. The phenomenon is important because it likely increases the competition between the foreign and domestic firms, thereby reducing, eliminating, or (in the case above) reversing the positive impact of the initial trade policy on the protected domestic firms. In turn, domestic consumers gain from increased competition, while the government loses direct revenue in the case of a tariff. Recent theoretical papers have broadened the issues connected with tariff-jumping FDI by considering models where the government and/or firms act strategically in the determination of trade policy when tariff-jumping FDI is possible.¹

¹ A number of papers, including Brander and Spencer (1987), Levinsohn (1989), Haaland and Wooten (1995) and Ellingsen and Warneryd (1998) focus on a government's optimal trade protection policy when tariff-jumping FDI is possible. In contrast, Smith (1987), Motta (1992) and Flam (1994) highlight various equilibria that may arise in a game where *both* the trade-policy-setting government and foreign firm are acting strategically. Finally, Blonigen and Ohno (1998) examine a setting where two exporting firms with different costs of tariff-jumping FDI act strategically when facing possible protection in their common export market.

However, despite the theoretical interest and importance of tariff-jumping FDI, few studies have focused on the issue empirically.² Even fewer papers (theoretical or empirical) have examined tariff-jumping FDI with respect to AD protection. Yet, tariff-jumping FDI connected with AD protection presents a number of interesting issues that are not present with other standard forms of trade protection because of how AD duties are determined and potentially changed over time. As in the Kodak-Fuji case above, AD duties are often quite high, averaging over almost 34% (median of 20%) for all firms receiving U.S. AD duties from 1980 through 1990. Unlike many other forms of trade protection, these duties are not determined by government and industry negotiations, but by technical calculations of the difference between the U.S. price of the imports and a definition of “fair” or “normal” value. Thus, there is no indication that the government is acting strategically in the sense of setting a tariff that affords maximum protection to the domestic industry without inducing tariff-jumping, as in the theoretical model presented by Ellingsen and Warneryd (1998).

U.S. AD protection also allows for AD duties to change over time as foreign firms change their prices. This means that a foreign firm can raise their U.S. price and ask for a calculation of the new dumping margin in what is termed an administrative review. While the dumping margin calculations conducted by the U.S. Department of Commerce (USDOC) are not always straightforward and methodology from the case to the review can change, DeVault (1996) shows that firms subject to U.S. AD duties are often successful in altering their pricing to receive substantially lower duties in administrative review subsequent to the case. Thus, this administrative review process may provide an important alternative to tariff-jumping by firms subject to AD cases, even when initial AD duties are high.³

² There are numerous empirical studies of the determinants of FDI that often include some measures of trade policies as explanatory variables. For many of these studies, these measures are not of primary interest and often must rely on trade policy measures that are relatively crude. This is particularly true when the frequency of the data are at an aggregate industry level or higher, because of issues connected with aggregating often product-specific protection.

³ In the European Union AD program, price undertakings may play a similar role to administrative reviews found in the United States. Vandenbussche, Veugelers and Belderbos (1999) theoretically examine the effect of European Union price undertakings on tariff-jumping incentives.

It is only recently that papers have empirically examined tariff-jumping with respect to AD protection. Barrell and Pain (1998) examine aggregate Japanese FDI flows into the United States and the European Union and find that measures of country-level AD activity are positively correlated with country-level inward FDI from Japan. Blonigen and Feenstra (1997) examine the interaction between trade policy measures and Japanese FDI for the United States from 1980-1988 using 4-digit SIC industry-level data. The study finds that both actual and threat measures of AD activity are correlated with increases in industry counts of FDI. Belderbos (1997) is the first study to match data on AD investigations and tariff-jumping FDI at the firm and product level. This is important since each AD case often involves just a handful of firms and very particular products. Disaggregated data is an appropriate way to examine firm-level incentives for tariff-jumping and, additionally, may reduce the likelihood of spurious correlation or aggregation bias. Belderbos' (1997) study examines the effect of U.S. and European Union AD investigations on Japanese FDI in 36 electronics products and finds that an affirmative AD decision on a particular firm and product has a substantial impact on the likelihood of the firm tariff-jumping. However, tariff-jumping effects are much stronger for the EU than for the U.S. in Belderbos' study.

This paper uses a newly-collected database on all firm and product combinations involved in U.S. AD investigations from 1980 through 1990 to examine tariff-jumping FDI responses to U.S. AD actions. Previous studies examine data of Japanese tariff-jumping FDI, which comprises only 20 percent of the firms involved in the U.S. AD actions from 1980 through 1990. A number of important observations come out of this analysis of the *comprehensive* set of firms and products involved U.S. AD investigations. First, a descriptive look at the raw numbers finds that the majority of tariff-jumping FDI occurrences (50 out of 80 instances) are by Japanese firms. In fact, the propensity of Japanese firms to locate production of a product in the United States after an affirmative case is 51.5 percent which is significantly higher than the 9.0 percent response by firms from other countries. I then test the effect of U.S. AD duties on FDI decisions using a probit estimation framework similar to the one used by Belderbos (1997) on Japanese electronics products and find that U.S. AD duties lead to higher FDI probabilities in my more general set of countries and products. While statistically significant, the magnitude

of the U.S. AD duty effect on tariff-jumping is quite modest. A 10 percentage point increase in the AD duty increases FDI probability by only 6 percent (from a 12.2% average probability of FDI at the means of the regressors to a 13.0% probability). In addition, despite the picture given by the raw numbers, I find no significant increased propensity of Japanese firms to tariff-jump U.S. AD duties, after controlling for other economic factors that affect a firm's decision to FDI.

One possible explanation for the fairly low tariff-jumping responses found by both this paper and Belderbos' (1997) study of Japanese electronics products is the role of the U.S. administrative review process that allows firms to receive lower duties and provides an alternative to tariff-jumping. In fact, this process may be quite attractive to foreign and domestic firms because it achieves very similar outcomes to a VER in the sense that it allows foreign firms to raise U.S. prices in exchange for lower (or eliminated) duties. To explore this further, the last section of the empirical analysis turns to a multinomial logit estimation of tariff-jumping responses by firms and product involved in affirmative U.S. AD cases. This framework allows modeling of a firm's response to U.S. AD duties as a simultaneous decision between 1) no action, 2) altering pricing behavior and requesting an administrative review to lower the initial AD duty, 3) locating production in the United States, or 4) both requesting a review and locating production in the United States.

Interestingly, there is no evidence that certain methodologies used by the USDOC that make a favorable administrative review less likely have much impact on tariff-jumping behavior. This is important because *a priori* these methodologies could substantially alter tariff-jumping FDI and subsequent outcomes for domestic firms. I also find that plant-level scale economies make tariff-jumping less likely, while a larger initial AD duty and trade volume increase the likelihood the firm will ask for an administrative review, but do not affect the likelihood of tariff-jumping. Importantly, the estimates again do not find that Japanese firms subject to affirmative U.S. AD actions are more likely to tariff-jump, everything else equal.

Instead, the most important factors that affect tariff-jumping responses for firms subject to U.S. AD duties are previous multinational experience and industrialized/LDC status. These two characteristics largely

explain a firm's tariff-jumping response when facing an AD duty. This is an important result for two reasons. First, it reveals that we see significant Japanese tariff-jumping because Japanese firms are from an industrialized country and have previous multinational experience, not because of some inherent Japanese response to the trade protection. Second, it highlights that the distributional consequences of AD actions are quite different depending on which import sources are investigated. For example, this may explain in part why less-developed WTO-member countries regard antidumping protection as a more important matter than industrialized member countries.

2. Salient Features of U.S. Antidumping Law and Administration

Before turning to the empirical analysis, this section provides a brief overview of the relevant details connected with U.S. AD investigations and administrative reviews. The U.S. AD laws are administered by the USDOC and U.S. International Trade Commission (USITC), each with distinct roles in the process. When an AD petition is filed, the USDOC determines whether the subject product is being sold at "less than fair value" in the United States. In contrast, the USITC determines whether the relevant U.S. domestic industry has been materially injured, or is threatened with material injury, by reason of the imports subject to its investigation.

The calculation of the dumping margin by the USDOC is usually not straightforward and revolves around how the USDOC measures what should be the "fair value" of the product sold in the United States. Selling a product in the United States at less than "fair value" is the definition of dumping and the difference between the U.S. price and "fair value" is the dumping margin. In theory, the USDOC defines "fair value" as the exporting firm's price for the same product in its own home market. However, if the firm's home market sales are deemed inadequate, then the USDOC may base "fair value" on the exporting firm's prices in third country markets or on a constructed value for the product using manufacturing costs, selling, general and administrative costs, profits and packaging costs. These calculations obviously involve highly detailed and

confidential data on the transactions of the investigated firm, which are requested by USDOC from the investigated firm. If the investigated firm does not comply sufficiently, the USDOC will turn to using the “best information available,” which is often information supplied by the U.S. firms that filed the petition.

If an affirmative preliminary determination is made by both the USDOC and the USITC, then the importer must post a cash deposit, a bond or other security for each entry equal to the preliminary margin determined by the USDOC. This requirement stays in effect until either the USDOC or the USITC makes a negative final determination. If an affirmative final determination is made by both the USITC and USDOC, then USDOC issues an AD order to levy a duty equal to the estimated dumping margin on the subject product.

When a subject foreign product enters the United States, the importer must pay Customs a cash deposit equal to the margin times the value of the subject product. However, these cash deposits do not necessarily represent the final amount of duties to be assessed on the subject imports. Rather, the margin determined in USDOC's final investigation is only used as a basis for *estimating* the duty liability of the importer. The actual liability of the importer may be determined in subsequent years by the USDOC. Before 1984, this was accomplished by automatic yearly administrative reviews by the USDOC. However, since 1984, such reviews have become voluntary; that is, unless an interested party requests a review, the duties assessed are those found in USDOC's final determination (or most recent administrative review). The purpose of an administrative review is to adjust the margin on subject imports to reflect changes in the difference between the foreign firm's U.S. price and the fair value. If a subsequent review determines that the margin during the review period is different from the previous margin used as a basis for the importer's cash deposit, a bill (or refund) in the amount of the difference plus interest is assessed (or rebated). This administrative review process is important for the analysis in section 4 and 5 below.

3. A First Look at FDI Patterns of Investigated Firms

The paper examines tariff-jumping FDI with respect to U.S. AD cases from 1980 through 1990. A starting date of 1980 is typical for studies of U.S. AD protection because it corresponds with significant changes in the law that led to correspondingly higher AD activity in the United States. I end the sample at 1990 to allow ample time to observe tariff-jumping FDI after the later AD cases in the sample. From 1980 to 1990 there were 485 AD cases filed against imported goods.⁴ Of these cases, 189 (39 percent) led to affirmative decisions and AD duties, 183 (38 percent) received negative determinations, 109 (22 percent) were terminated, and 4 (1 percent) were suspended *in lieu* of a negotiated agreement. The 189 affirmative cases led to firm-specific margins for 431 firms at the time of the case, while there were 376 firms investigated for firm-specific margins in cases that were eventually terminated, suspended, or ruled negative.⁵

Before examining the data on tariff-jumping FDI, I present information on the general magnitude of the duties and trade volumes for these cases. The average duty received by a firm specifically named in an affirmative case is approximately 34 percent, with a standard deviation of 38 percent and a median of 20 percent. Thus, the vast majority of affirmative decisions led to high *ad valorem* duties, which would suggest strong incentives for tariff-jumping. Another obvious factor affecting tariff-jumping incentives is the magnitude of trade affected by the investigation and/or AD duties. Data on the value of subject imports is not reported in about 20 percent of the cases because the information is classified “business confidential”. However, one can

⁴ There were a number of AD investigations that led to separate margins for firms across more than one product. The most important example is USITC case 731-394 (Antifriction Bearings), for which firms could receive separate margins for 1) Antifriction Bearings, 2) Cylindrical Ball Bearings, 3) Spherical Ball Bearings, 4) Spherical Plain Ball Bearings, and 5) Needle Ball Bearings. For purposes of analysis I treat each of these product categories as separate AD cases.

⁵ There were an additional 717 firms affected by these affirmative decisions that did not receive firm-specific margins at the time of the case, but were revealed subsequently in administrative reviews. These were primarily firms that exported small amounts of the subject product to the United States at the time of the case or subsequently began exporting the subject product. These firms do not have a firm-specific margins and face the trade-weighted average of the firm-specific margins unless they request a review.

estimate these values using import data and the publicly-listed TSUSA or HTS product codes for each case.⁶ Using this method, I have information on subject trade volume (in dollars) for 405 of the 431 firms and find that the average value of the subject imports for each firm receiving a firm-specific duty is approximately \$14 million, but the standard deviation is \$36 million and the median value is only \$4.3 million. This distribution of trade volumes suggests that, except for a few large cases, the value of the trade subject to the duties was not particularly large.⁷

Table 1 presents tariff-jumping FDI responses of firms involved in affirmative U.S. AD cases filed from 1980 through 1990, by select countries or regions, while table 2 indicates tariff-jumping for nonaffirmative cases. Before examining the general patterns in tables 1 and 2, there are a number of things to note about the data on tariff-jumping FDI. The collection and identification of tariff-jumping FDI by investigated firms in the subject product is not a straightforward task. I examined a wide variety of sources with information on foreign-owned affiliates in the United States, each with varying detail in the information they report (see data appendix for data sources used). One concern is whether an instance of FDI after an AD case occurs because of factors connected with the case or simply because market conditions have changed enough to alter the firm's FDI decision regardless of the previous AD case. As a result, tables 1 and 2 show three different measurements of tariff-jumping FDI: 1) tariff-jumping FDI during the case or within 3 years after the case, 2) tariff-jumping FDI more than 3 years after the case, and 3) a total of these two measurements of tariff-jumping FDI. While this is an important concern, tables 1 and 2 show most FDI in the subject product occurs during the most recent 3-year period and, in the end, the distinction has no qualitative impact on the empirical

⁶ Prusa (1997) employs the same method to estimate trade volumes of subject imports. See data appendix for more details on data construction. In the estimation below, I deal more specifically with the accuracy of the estimated data for this variable.

⁷ The largest affirmative cases in terms of trade volumes of subject products during this period were Frozen Concentrated Orange Juice from Brazil (\$696 million), Sweaters from Taiwan (\$405 million), Sweaters from Korea (\$400 million), 64k Drums from Japan (\$267 million), Forklift Trucks from Japan (\$241 million) and Antifriction Bearings from Japan (\$238 million).

analysis below and the paper's overall conclusions.

The first column of table 1 breaks the sample into countries and regions with significant numbers of firms that received AD duties in the United States for cases filed between 1980 and 1990. The second column gives the total number of firms from the associated region that received AD duties and the subsequent three columns display the three measurements of tariff-jumping FDI discussed above. Japan had the highest number of firms receiving AD duties during the sample (97 firms) and also displayed by far the largest amount of tariff-jumping FDI. Within the first three years, 41 of the 97 Japanese firms (42.3%) tariff-jumped the AD duty by locating production in the United States, and there are a total of 50 (51.5%) eventual occurrences of FDI in products subject to AD duties. The rest of the table shows that Japan is largely unique in these responses. While Japanese firms represent less than a quarter of the sample firms, they accounted for over half (50 out of 80) of the total possible tariff-jumping FDI responses in the sample. Firms from European countries accounted for many of the remaining tariff-jumping FDI occurrences, but the percentage of European firms tariff-jumping is significantly smaller than for the Japanese sample of firms (24.7% versus 51.5%). The rest of the regions and countries display very little FDI responses. In fact, the two instances of tariff-jumping FDI from "Other Southeast Asia" involve two Japanese-owned subsidiaries in Singapore, while one of the tariff-jumping FDI instances for Canada involved a Japanese-owned subsidiary. As mentioned earlier, previous empirical studies of tariff-jumping of AD duties have focused solely on Japanese firms. Table 1 highlights that the behavior of Japanese firms is likely not representative of other firms' tariff-jumping responses. Thus, one focus of the empirical work below will be to examine whether this apparently unique behavior by Japanese firms can be explained by observable economic factors.

Table 2 examines the data for possible tariff-jumping responses by firms involved in U.S. AD investigations that were terminated, suspended, or ruled negative. The term "tariff-jumping" for these cases refers to FDI motivated by either a higher perceived threat of future AD duties because of the prior case, or to other forms of trade protection that arose from the AD termination or suspension. For example, with respect

to the latter, cases are suspended when foreign firms agree to lower trade volumes and/or higher prices. AD case terminations can occur for a number of reasons, but numerous steel cases in the early 1980s were terminated because of a subsequent VER agreement. However, as table 2 indicates, there is very little tariff-jumping FDI by firms involved in nonaffirmative decisions, with only 6.4 % of the firm-product observations displaying subsequent FDI in the United States. An exception is the suspended cases where almost half of the 15 observations saw subsequent FDI. This is driven by the semiconductor cases involving Japanese firms in the mid-1980s that led a suspension *in lieu* of the 1986 U.S.-Japan Semiconductor Agreement. In fact, as with the affirmative cases, Japanese firms accounted for most of the tariff-jumping FDI with respect to these nonaffirmative cases – 15 of the 24 possible tariff-jumping responses.

4. How do AD duties affect the FDI decision?

This section tests to what extent U.S. AD duties on a particular firm and product increase the probability the firm will locate production in the United States for that particular product. Only Belderbos (1997) explores similarly disaggregated data that matches AD duties and FDI at the firm-product level. That study focused exclusively on Japanese electronic firms and products, whereas I analyze firm-product observations across a comprehensive set of countries and products subject to U.S. AD investigations from 1980 to 1990.

4.1. Empirical model specification

The empirical model I will test is the following binary choice model:

$$\begin{aligned} \text{FDI}_{ij} &= 1 && \text{if } \Pi_{ij}^* > 0 \text{ and} \\ \text{FDI}_{ij} &= 0 && \text{if } \Pi_{ij}^* \leq 0, \end{aligned} \tag{1}$$

where FDI represents the FDI decision, (i) indexes firms, (j) indexes products, and Π^* represents the unobserved profit difference for the firm between FDI and its next best alternative, which is presumably either exporting

or no sales to the foreign market. By further assuming that

$$\Pi_{ij}^* = \beta' X_{ij} + \epsilon_{ij}, \quad (2)$$

where X_{ij} is a vector of explanatory variables and $\epsilon \sim N[0,1]$, I can estimate this model with a standard univariate probit framework.

4.2. Variables and data

The main focus is the effect of an affirmative U.S. AD decision on the probability that the firm will locate production in the United States in the particular product. To examine this, I use data on the initial AD duty. While the firm- and product- specific duty may change over time through administrative reviews, presumably higher initial AD duties still imply a higher effective level of trade protection and hence a more costly barrier to the firm, even if it chooses to take actions to reduce the AD duty through reviews. Thus, the hypothesis is that a higher initial AD duties makes FDI for firm i in product j more likely.

As controls, I also include a number of other explanatory variables that should affect the firm's decision on FDI for a particular product relative to other options. Because I'm examining a diverse sample of countries and products, there are some limitations to the controls I'm able to employ. Firm characteristics include whether the home country of the firm is less-developed and whether the firm has prior experience in multinational activities (in the sense of having prior FDI or not). The less-developed country variable (an indicator variable - see appendix for classification of countries) is expected to have a negative impact on the FDI probability for a firm in a particular product. One reason is the cost differences such a firm may experience from producing in the United States versus their home country. The ability of less-developed country firms to produce and sell goods in the world market may primarily stem from country-specific characteristics (e.g., abundant and cheap low-skilled labor) and is likely lost if they have to relocate production in the United States. Additionally, availability of capital may be a serious constraint for firms in some of these countries. Prior experience in

multinational production is also specified as an indicator variable and is expected to have a positive impact on FDI probability. Presumably there are economies of scale/scope for FDI activities by a firm because of the large initial fixed costs of gaining knowledge and experience in locating production abroad, which once gained, can be applied across a variety of localities. Additionally, a number of previous empirical studies have found that previous FDI experience positively affects current FDI probabilities.⁸

With respect to product characteristics, I include measures of plant-level scale economies and the value of the U.S. imports. Plant-level scale economies indicate larger fixed costs of entry and, hence, are expected to be inversely correlated with FDI entry probability. My measure of plant-level scale economies is average U.S. plant size in the product's associated 4-digit SIC industry. The value of the product's imports is likely to be correlated with an increased probability of FDI. Buckley and Casson (1981) note that serving a market through local production (i.e., FDI) likely involves higher fixed costs than through exporting, though the marginal cost is lower with local production because of lower transportation costs. Thus, local production will have lower average costs than exporting only after a significant level of sales volume. Thus, I expect higher import value for the product should make FDI more likely. For the majority of products subject to U.S. AD investigations, product import volumes and the number of foreign firms involved in the case are made publicly available. This allows me to estimate product-level import volumes for the firms involved in these investigations.⁹

An important issue in constructing a sample to estimate the model is the choice of control group. I use firms and products involved in cases that were not ruled affirmative as the control group for a couple important reasons. First, I know that these particular products were being produced by the firm and exported to the United States.¹⁰ It is often very difficult to obtain information on which particular products are produced and exported

⁸ These studies include Yu (1990), Kogut and Chang (1996) and Belderbos (1997).

⁹ A data appendix provides more detail on the construction of variables used in the paper's analysis.

¹⁰ This is presumably a necessary condition for a firm to have any probability of locating production in the United States and, thus, inclusion of firm-product pairs where this is not true would be

by firms. Second, the firm's involvement in the case often allows me to obtain estimates of the level of the firm's export sales to the United States for the particular product. This information is even more difficult to obtain by firm and product for any given foreign firm, but is likely an important determinant of the firm's decision to invest production in the United States.

The potential disadvantage of this control group is the concern that nonaffirmative cases are leading to increased production in the United States as well. Thus, this control group would bias the estimated effect of affirmative AD decisions and duties on tariff-jumping toward not finding any effect. This concern is greatly mitigated by the relative number of FDI occurrences subsequent to nonaffirmative decisions shown in Table 2. When one excludes the handful of suspended cases, there is post-investigation FDI in the investigated products in less than five percent of the cases. Consistent with this, Belderbos (1997) found no impact of nonaffirmative decisions on firms' probabilities of U.S. FDI in his sample of Japanese electronic firms and products. Finally, the results below will find significantly different FDI probabilities between the two samples, despite any potential bias.

4.3. Empirical results

Column 1 of table 4 displays marginal effects from probit estimation of the model's base specification. All control regressors, with the exception of import value, have hypothesized sign and are statistically significant at the 5 percent level or higher. Overall fit of the estimation model is quite high as evidenced by prediction table 5 - over 90 percent of the observations are correctly predicted by the model.

The estimates also suggest economically significant effects of some of the control regressors on FDI probabilities. Firms from less-developed countries have a 6.5 percentage point lower probability of FDI at the means of the regressors, everything else equal. This is a substantial effect given a sample average FDI probability of 12.2 percent. If the firm has had previous multinational production experience, the probability

uninformative at best.

of FDI at the means goes up 11.8 percentage points. Thus, multinational production experience can more than offset the disadvantages of location in a less-developed country. Plant-level scale economies have a modest impact on FDI probability with a standard deviation increase in an industries plant-level scale economies, leading to a 1.5 percentage point decrease in the FDI probability. The effect of import value has the wrong sign and is statistically insignificant. This is likely due to measurement in this regressor which will be addressed below.

Consistent with previous studies of Japanese firms responses to AD investigations and duties, I find statistically significant tariff-jumping effect with respect to a sample that includes all firms and products involved in affirmative U.S. AD investigations. This tariff-jumping effect is increasing in the initial AD duty as well. A standard deviation increase in the AD duty leads to a 2.5 percentage increase in FDI probability at the means of the regressors. So while the effect is highly significant in a statistical sense, the economic effect may not be as large as one would expect. One concern is that there are a few outlying AD duties in the sample above 100 percent. When one excludes these 6 observations, the estimated marginal effect of AD duty levels is about 25 percent higher.

Another concern is that there are macroeconomic changes, such as exchange rate movements, and/or industry characteristics that may be correlated with a higher incidence of U.S. cases against foreign dumping and which also may independently lead to greater FDI activity into the United States. To control for macroeconomic changes, I included yearly dummy variables, but found these controls to be jointly insignificant ($\chi(10)=13.76$ with $p\text{-value}=0.18$). The typical way to control for unobserved industry characteristics is to include industry dummies. In this setting with a dependent variable that is a dummy variable as well, one has to be careful that any included dummy regressor is not perfectly collinear with the dependent variable. This limits the industry dummy variables I include to only those industry categories that are substantial enough to avoid this problem. In the end, I can include 5 major industry categories: 1) Non-manufacturing industries, 2) chemicals (SIC 28), 3) iron and steel products (SIC 33), 4) fabricated metal products (SIC 34), and

electrical/electronic machinery (SIC 36). A Wald statistic indicates these industry dummies are jointly significant ($\chi(5)=24.42$ with $p\text{-value}=0.00$) and the individual t-statistics suggest that the two main statistically significant effects are that the chemical industry is less likely to engage in FDI, while the electrical/electronic machinery sector is more likely to FDI, everything else equal. Column 2 of table 5 reports estimates from inclusion of these industry dummies and, importantly, the marginal effects of the other variables, including the AD duty, are not substantially affected.¹¹

Given the focus of previous studies on Japanese firms only, one important question is whether Japanese firms are different in their FDI probabilities and tariff-jumping FDI probabilities, respectively, once other factors are held constant. Column 3 of table 5 includes two variables to test these effects. The first variable is an indicator variable of whether the firm is a Japanese firm or not. The second variable is an interaction term between this Japanese firm indicator variable and the AD duty variable. Though positive in sign, both are statistically insignificant at standard confidence levels. This is surprising at first glance, given the descriptive data evidence in table 1 showing that Japanese firms have a much higher likelihood of FDI after an AD duty is in place than any other country or region. This difference can be explained almost exclusively in the data from the fact that a much higher percentage of Japanese firms are multinational than the average firm in the sample (61 percent versus 27 percent) and that Japan is not a less-developed country. Once controlling for these factors, there is nothing inherently “Japanese” that leads to greater tariff-jumping of U.S. AD duties.

As mentioned above, there is considerable noise in the import value control regressor. In particular, for about 20 percent of the observations there are no public figures available and I estimated import value for an investigated product as the customs value of the publicly listed TSUSA or HTS product codes associated with

¹¹ An alternative is to include a wide variety of industry-related characteristics as controls. I experimented with inclusion of U.S. data on R&D intensity, capital intensity, concentration ratios, advertising intensity, innovation rates and average plant size (in terms of employment) with the associated 4-digit SIC industry of the investigated product. One problem is that these data are generally available for just the manufacturing industries, which cuts the sample observations by almost 30 percent. Using this reduced sample, these industry controls were jointly statistically significant, but the marginal effects of the other variables, including the AD duty, are not substantially affected.

the case. In a number of cases, it is clear that this is very inexact, as the subject product comprises only parts of selected TSUSA or HTS codes. Column 4 of table 4 presents estimates of the model from a sample where I eliminate the observations for which this estimation of import value was obviously inexact. As one would expect, the marginal effect of import value is now positively correlated with FDI probability, though it remains statistically insignificant. Importantly, the marginal effects of the other explanatory variables are largely unaffected, although the estimated tariff-jumping effect has decreased by about 14 percent.

A final concern I address is inclusion of terminated cases in the sample. U.S. AD cases can be terminated for a variety of reasons, including withdrawals of the petition by domestic petitioners. As Prusa (1992) notes, these terminated/withdrawn cases can lead to private settlements amongst the domestic and foreign firms with exemption from U.S. antitrust laws. Additionally, a large number of terminated cases in the sample involve steel products that were terminated *in lieu* of negotiated steel VERs in the mid-1980s.

These cases may not be an appropriate control group if FDI probabilities are affected by these settlements. Column 5 of table 4 reports marginal effects from a sample that excludes observations from terminated cases. The tariff-jumping effect, as well as the effect of multinational experience and less-developed country status, are robust to this change in the sample.

In summary, using a sample of all products and firms involved in U.S. AD cases from 1980 to 1990, there is evidence of tariff-jumping FDI that is statistically significant and robust to a variety of specifications. The estimates also show that firms with previous multinational production experience are more likely to FDI and firms from less-developed countries are less likely to FDI, holding other things constant. While the tariff-jumping effect is statistically significant, it shows up as a modest effect, which is also consistent with the fact that even for the affirmative observations, the likelihood of FDI is less than 20 percent.

On a final note, these estimates of tariff-jumping FDI may be consistent with a variety of scenarios connected with how and why U.S. antidumping investigations are initiated in the first place. For example, Blonigen and Ohno (1998) present a theoretical model where one or more foreign firms engage in dumping to

initiate antidumping investigations because they have a particular advantage in their ability to tariff-jump any subsequent AD duty relative to their foreign rivals. Blonigen and Ohno call this protection-building trade behavior. This contrasts with a more standard story of foreign firms tariff-jumping solely as a reaction to an investigation instigated by U.S. domestic firms. While the empirical approach here cannot distinguish between these two scenarios, both involve FDI that occurs because the AD duty eventually comes into place and, hence, can be broadly defined as tariff-jumping FDI.¹²

5. Testing the determinants of firms' responses to AD duties

5.1. Empirical model specification.

To examine only whether a firm tariff-jumps or not and estimate this single discrete choice in a standard logit or probit estimation framework ignores the additional options available to a firm because of the administrative review process. To avoid this source of bias, this section presents and estimates an empirical model in which a firm facing an AD duty in the foreign market has four possible responses:

1) no action, 2) alter its pricing behavior and request an administrative review only, 3) locate production abroad only, or 4) both request a review and locate at least some production abroad. Each option is associated with a

$$\Pi_{kij} = \pi_k(X_{ij}) + \epsilon_{kij}, \quad (3)$$

level of profitability denoted where k indexes actions, i indexes firms, j indexes products, π_k represents observable profit from action k , X_i represents a vector of observable firm characteristics, and ϵ_{ki} is a random variable representing unobservable profitability for firm i choosing action k . Given this framework, the firm chooses the action that leads to the highest profitability. Thus, for example, the probability of observing the firm

¹² The result that FDI is likely a prohibitive option for firms from LDCs and/or without multinational experience is consistent with protection-building trade in that it shows there are substantial differences in firms' abilities to tariff-jump -- a necessary condition for protection-building trade.

choosing R is equal to the probability that the firm's profitability when it chooses R is higher than its profitability when choosing any of the other possible actions. More formally,

$$\text{Prob}[K_{ij} = \text{Action } R] = \text{Prob}[\Pi_{Rij} > \Pi_{kij}] \quad \forall k \neq R. \quad (4)$$

Assuming that $\pi_k(\cdot)$ can be approximated as a linear function in X_i and the disturbances are independently and identically distributed with extreme value distribution, we can express the action probabilities as:

$$\text{Prob}[K_{ij} = \text{Action } k] = \frac{\exp(\beta'_k X_{ij})}{\sum_k \exp(\beta'_k X_{ij})}, \quad (5)$$

where β_k are the parameters to be estimated. It should be noted that the estimated parameters vary by action, not by individual firm. This model is commonly known as the multinomial logit model and can be estimated using standard maximum likelihood techniques.

5.2. Variables and data

For estimation, I specify the dependent variable as taking the value of "0" for "No action", "1" for "Administrative review only", "2" for "FDI only", and "3" for "Both review and FDI". Data for whether a firm requests an administrative review was collected from *Federal Register* notices, while the data for the FDI responses come from the sources described in the section 3 and the data appendix. Of the 431 observations used for estimation, 212 firms chose "No action", 123 chose to file for an "Administrative review only", 40 chose "FDI only", and 56 chose "Both review and FDI."

I use the same explanatory variables as in the probit estimation, which are the initial AD duty, the import value, plant-level scale economies, previous multinational production experience, and industrialized/LDC status of host country. Additionally, I wish to specify a measure that captures the cost to a firm from choosing an administrative review in order to assess the impact of this process on the firm's FDI decision when facing an

AD duty. While one might assume that the costs of filing for an administrative review are identical for all firms, there is evidence that it is not. Often foreign firms choose not to respond to USDOC requests for pricing information for determining margins. There are examples (related by USDOC in *Federal Register* notices) where the firms did not prepare the information as USDOC requested or responded that they found it too difficult to do so. Presumably, there are also times when firms decide that it would be too costly to reveal this normally confidential information for a variety of reasons. When this occurs, the USDOC must rely on “best information available” (or BIA) which is often data provided by the U.S. petitioning firms. Thus, I take reliance on BIA by USDOC at the time of the initial case as a proxy for high costs of requesting and participating in an administrative review for a particular firm.

In addition to BIA, previous multinational production experience and industrialized/LDC status may also affect the cost of administrative reviews. U.S. administrative reviews may be much more costly for foreign firms that are not as familiar with the English language or have the necessary resources to collect internally the often voluminous amounts of data requested by the USDOC. Larger multinational firms and firms from industrialized countries likely conduct more business in English and keep more detailed internal records of their transactions. Thus, these two variables may affect the tariff-jumping probabilities through their effect on administrative review costs, as well as their direct effects on tariff-jumping FDI.

Because the administrative review process is an option conditional on receiving an affirmative U.S. AD decision, I focus on only the 431 firm and product combinations that ultimately faced an AD duty. In this sense, I am testing the factors that affect a firm’s choice conditional an affirmative U.S. AD decision. One concern would be that there may be significant sample selection bias. For example, perhaps firms with high import values are more likely to receive AD duties, as well as more likely to FDI. If this is the case, the estimated effect of import value on tariff-jumping FDI in this sample of affirmative-case observations may be biased downward simply because the sample only contains high import value observations. However, the data suggest there is no sample selection bias, in that there are no differences in the means of the variables between the affirmative-only

sample and the full sample. To see this, table 6 presents the descriptive statistics related to the explanatory variables for this sample of firm- and country level observations subject to affirmative U.S. AD investigations, which one can compare to the descriptive statistics for the full sample in table 3. Across all the common explanatory variables, the averages for the affirmative sample look almost identical to the full sample, suggesting no evidence of sample selection problems.¹³

5.3. Empirical results

In order to identify the coefficients in the model, I estimate the multinomial logit model above by normalizing the coefficients on the explanatory variables for “No Action” to zero. This yields coefficient estimates for the other three actions only. However, from the coefficient estimates one can compute the marginal effects of the explanatory variables for all four actions. For this reason and because marginal effects are more easily interpreted, I only present marginal effects and their associated standard errors, which are computed at the means of the data.

Table 7 presents the marginal effects estimates of firms responses to U.S. AD duties using the 431 firm-level observations from 1980 through 1990. Many of the marginal effects are statistically significant at the one-percent level and the chi-squared test statistic ($\chi^2(18) = 212.92$) strongly rejects the null hypotheses that the estimated coefficients are jointly zero.¹⁴ In general, many of the explanatory variables have expected signs over the possible actions. The marginal effects show that firms from less-developed

¹³ The percent of observations from LDCs is 54% for the affirmative sample and 53% for the full sample. Similar comparisons of affirmative versus full sample are 31% versus 27% with previous multinational experience, average import value of \$17 million versus \$14 million, and average plant size of 134 employees versus 162 employees. None of these differences between sample averages are statistically significant. The only variable where there is a significant difference is with the average AD duty (34% to 19%), which one would expect given that the nonaffirmative cases have an average duty of 0 percent.

¹⁴ Similar chi-squared tests of joint significance with respect to the coefficients for each of the three estimated outcomes rejects the null hypothesis at the one percent significance level as well.

countries are more likely to not respond, and less likely to locate production in the United States. Thus, as with the probit estimation of the full sample, the less-developed country status has a chilling effect on FDI. As before, multinational firm status also strongly affects the likelihood of tariff-jumping FDI and makes it less likely the firm will not act or ask for only an administrative review. Plant-level scale economies, which proxies for higher fixed costs of FDI, is negatively correlated with the two actions involving FDI and also positively correlated with a much greater probability of no action by the firm. The higher the initial AD duty, the less likely a firm will choose “no action”, and there is marginal evidence that it will likely choose to ask for an administrative review. Surprisingly, the size of the initial AD duty has little estimated impact on the FDI decisions. Unlike the other variables, the value of the subject product generates estimates that are more difficult to reconcile. As before, there is no statistically significant correlations with respect to import value, which likely stem from the measurement issue connected with this variable.

Of particular interest with this section’s analysis is the effect of the USDOC’s use of BIA, which proxies for higher costs of receiving a lower duty from an administrative review. The estimates reveal that it is more likely the firm will take no action and significantly reduces the probability that the firm pursues an administrative review. Interestingly, this higher cost of an administrative review (through the USDOC’s use of BIA) has no statistically significant effect on the probability the firm will FDI.

The correspondence between actual outcomes and those predicted by the basic model are displayed in table 8. This prediction table is one measure of fit in the model. Predicted outcomes match actual outcomes for 57 percent of the observations. This can be compared to a model that assigns predicted outcomes equally across all four actual outcome possibilities, which would yield a match rate of 25 percent. Together with the statistical significance of the overall model, the prediction table suggests the empirical model in table 8 is decently specified. However, the model clearly does best at predicting the “no action” firms (88 percent match) and “both review and FDI” observations (66 percent match). One alternative that may have better prediction capability is to combine the “FDI only” and “Both review and FDI” into one

combined “FDI” action. When I estimate a model where the dependent variable only allows for three outcomes (“No action”, “Administrative review only”, and “FDI”), the prediction power goes up only modestly with 62 percent matching, and the marginal effects results are qualitatively similar to the model shown.¹⁵ The predictive power does not improve much because, in both models many of the “administrative review only” outcomes are predicted to be no action. However, it is clear that this relatively poorer match for the “administrative review only” outcome stems from the firms from less-developed countries in the sample. When I estimate the model with industrialized countries only I get qualitatively similar results on coefficient estimates, but the match of actual and predicted outcomes for this “administrative review only” outcome is 34 out of 49, or 69 percent.

While table 7 presents marginal effects at the means, an alternative way to understand the magnitude of relationships between the explanatory variables and the firms’ responses is to vary one explanatory variable across all observations, use the model’s estimated coefficients to predict new outcomes, and average across the sample’s observations. This is particularly easy to do with the model’s binary variables. Table 9 shows the model’s average predicted outcomes for various scenarios. The first row of table 9 shows the predicted outcomes, given the true values of the explanatory variables. The next two rows show the predicted outcomes if *all* firms in the sample were multinational firms and the predicted outcomes if *no* firms in the sample were multinational. The next four rows conduct the same exercise with respect to less-developed country status and the USDOC’s use of BIA. The table shows that the effect of multinational firm status and country of origin have large impacts on the predicted outcomes. Everything else constant, if all the firms subject to affirmative U.S. AD actions during 1980 to 1990 period had been multinational firms, the estimates predict that 47 percent of the firms would have tariff-jumped. This compares to the 22 percent of the sample firms that actually jumped during this period. If all firms in the sample had no multinational experience,

¹⁵ These results, not reported here to save space, are available from the author upon request. This is also true for other estimation results mentioned below, but not reported in the text or tables.

the estimates predict that less than 8 percent would have tariff-jumped. Firms from less-developed countries similarly have much lower probabilities of responding to U.S. AD actions with tariff-jumping FDI. If all firms in the sample were from less-developed countries, only 11 percent would tariff-jump, whereas if all firms were from developed countries, 31 percent are predicted to tariff-jump. Finally, the USDOC's use of BIA significantly affects the probability of firm's asking for administrative reviews versus not responding.

As with the analysis in section 4, it is interesting to examine whether Japanese firms' responses to U.S. AD actions are different from firms in other countries. In this sample, approximately 20 percent of the observations are Japanese-owned firms. To test for any Japanese-specific effects, table 10 reports marginal effects from the basic model when I include a binary variable that takes the value of "1" when the observation is of a Japanese firm, while table 11 reports the frequencies of actual and predicted outcomes from the estimation. While the marginal effects of the other explanatory variables remain quite similar to those reported above, the coefficients on the "Japanese firm" variable is statistically insignificant for three of the four choices and, in fact, suggest that Japanese firms are less likely to ask for a review and FDI, everything else equal! How can these results be reconciled with the substantial Japanese tariff-jumping FDI activity? A large portion of the answer lies in the fact that many of the Japanese firms in the sample (73 percent) are multinational firms, which has a strong impact on the probability of actions involving tariff-jumping FDI. This suggests that while quite a bit of the tariff-jumping FDI we observe is by Japanese firms, it is not the case that these firms have a greater propensity to tariff-jump, everything else equal. On the contrary, the evidence is that there is an underlying reluctance to tariff-jump that is specific to the Japanese firms.

6. Conclusion

While previous papers have established a positive correlation between AD protection and FDI for Japanese firms, there has been no comprehensive evaluation of tariff-jumping of U.S. AD duties. Using a newly constructed database, this paper uses a variety of complementary analyses to examine the tariff-jumping

response across all firm- and product-observations subject to U.S. AD investigations from 1980-1990. The results consistently support the hypothesis that tariff-jumping is a realistic option for only multinational firms from industrialized countries. Because many firms subject to U.S. AD investigations and eventual duties do not have these characteristics, tariff-jumping of U.S. AD protection is relatively modest. While the raw numbers show a high tariff-response rate for Japanese firms, this is due almost solely to the fact that many of these firms have substantial multinational experience, not any Japanese-specific response. As one would expect, industries with large plant-level economies of scale see much less tariff-jumping as well, all else equal. Interestingly, there is no evidence that certain methodologies used by the USDOC (that make a favorable administrative review less likely) have much impact on tariff-jumping behavior. This is important because *a priori* these methodologies could substantially alter tariff-jumping FDI and subsequent outcomes for domestic firms.

These findings are particularly important in understanding distributional consequences of U.S. AD actions. As the Kodak-Fuji case points out, tariff-jumping can be an important option for a foreign firm to maintain substantial presence in the U.S. market in the face of such investigations. However, this option is seemingly unrealistic for firms from LDCs and/or with little multinational production experience. Thus, it is not surprising that developing countries have become much more adamant about addressing AD protection within the context of WTO than industrialized countries. Since the conclusion of the Uruguay Round many countries around the world (including many less-developed countries) are implementing new WTO-consistent AD programs of their own, which are patterned after the AD programs in the U.S. and the EU. With respect to the U.S., Gallaway, Blonigen and Flynn (1999) provide estimates that place the collective effect of AD duties in the U.S. as one of its largest trade protection programs. These tariff-jumping effects and their welfare consequences become more important in face of this rising world AD protectionism.

References

- Barrell, Ray and Nigel Pain. (1999) "Trade Restraints and Japanese Direct Investment Flows," *European Economic Review*. Vol. 43(1): 29-45.
- Belderbos, Rene A. (1997) "Antidumping and Tariff Jumping: Japanese Firms' DFI in the European Union and the United States," *Weltwirtschaftliches Archiv*. Vol. 133(3): 419-57.
- Blonigen, Bruce A. and Robert C. Feenstra. (1997) "Protectionist Threats and Foreign Direct Investment," in Robert C. Feenstra (Ed.), *Effects of U.S. Trade Protection and Promotion Policies*. Chicago: University of Chicago Press (NBER), 55-80.
- Blonigen, Bruce A. and Yuka Ohno. (1998) "Endogenous Protection, Foreign Direct Investment and Protection-building Trade," *Journal of International Economics*. Vol. 46(2): 205-27.
- Brander, James A. and Barbara J. Spencer. (1987) "Foreign Direct Investment with Unemployment and Endogenous Taxes and Tariffs," *Journal of International Economics*. Vol. 22: 257-79.
- Buckley, Peter J. and Mark Casson. (1981) "The Optimal Timing of Foreign Direct Investment," *Economic Journal*. Vol. 91: 75-87.
- DeVault, James M. (1996) "U.S. Antidumping Administrative Reviews," *International Trade Journal*. Vol. 10(2): 247-67.
- Ellingsen, Tore, and Karl Warneryd. (1999) "Foreign Direct Investment and the Political Economy of Protection," *International Economic Review*. Vol. 40(2): 357-79.
- Flam, Harry. (1994) "EC Members Fighting about Surplus: VERs, FDI, and Japanese Cars," *Journal of International Economics*. Vol. 36: 117-31.
- Gallaway, Michael P., Bruce A. Blonigen, and Joseph E. Flynn. (1999) "Welfare Costs of U.S. Unfair Trade Laws," *Journal of International Economics*, Vol. 49(2): 211-44.
- Haaland, Jan I. and Ian Wooton. (1998) "Anti-dumping Jumping: Reciprocal Anti-dumping and Industrial Location," *Weltwirtschaftliches Archiv*, Vol. 134(2): 340-62.
- Kogut, Bruce and Sea Jin Chang. (1996) "Platform Investments and Volatile Exchange Rates: Direct Investment in the United States by Japanese Electronic Companies," *Review of Economics and Statistics*. Vol. 78(2): 221-31.
- Komuro, Norio. (1998) "Kodak-Fuji Film Dispute and the WTO Panel Ruling," *Journal of World Trade Law*, Vol. 32(5): 161-217.
- Levinsohn, James A. (1989) "Strategic Trade Policy When Firms Can Invest Abroad: When Are Tariffs and Quotas Equivalent?" *Journal of International Economics*. Vol. 27: 129-46.
- Motta, Massimo. (1992) "Multinational Firms and the Tariff-jumping Argument: A Game Theoretic Analysis

With Some Unconventional Conclusions,” *European Economic Review*. 36: 1557-71.

Smith, Alasdair. (1987) “Strategic Investment, Multinational Corporations and Trade Policy,” *European Economic Review*. Vol. 31: 89-96.

Vandenbussche, Hylke, Reinhilde Veugelers, and Rene Belderbos. (December 1999) “Undertakings and Antidumping Jumping FDI in Europe,” CEPR Discussion Paper 2320.

Yu, C. -M. (1990) “The Experience Effect and Foreign Direct Investment,” *Weltwirtschaftliches Archiv*, Vol. 126: 561-80.

Table 1: Tariff-jumping foreign direct investment (FDI) responses of firms involved in affirmative U.S. AD cases filed from 1980 through 1990, by country or region.

Country or region	Number of firms in cases	FDI during case or within 3 years of case	FDI more than 3 years after the case	Total tariff-jumping FDI cases
All countries	431	65 (15.1 %)	15 (3.5 %)	80 (18.6 %)
Japan	97	41 (42.3 %)	9 (9.3 %)	50 (51.5 %)
Europe ¹	85	19 (22.4 %)	2 (2.4 %)	21 (24.7 %)
Canada	22	0 (0.0 %)	2 (9.1 %)	2 (9.1 %)
Taiwan	53	1 (1.9 %)	0 (0.0 %)	1 (1.9 %)
Korea	48	3 (6.3 %)	1 (2.1 %)	4 (8.3 %)
Other Southeast Asia ²	14	1 (7.1 %)	1 (7.1 %)	2 (14.3 %)
Central and South America ³	48	1 (2.1 %)	0 (0.0 %)	1 (2.1 %)
All Other	64	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)

¹ Includes Belgium, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden and the United Kingdom.

² Includes Hong Kong, India, New Zealand, Singapore, and Thailand.

³ Includes Argentina, Brazil, Columbia, Costa Rica, Ecuador, Mexico, Trinidad & Tobago, and Venezuela.

ADDITIONAL NOTES: All measures of FDI refer to FDI by firm in the product subject to the associated affirmative U.S. AD investigation. Percentages in brackets are with respect to total “number of firms in cases” for the associated country or region. The final column, “Total tariff-jumping FDI cases,” is the total of the previous two columns for the associated country or region. See data appendix for more details on tariff-jumping identification and data sources.

Table 2: Tariff-jumping foreign direct investment (FDI) responses of firms involved in nonaffirmative U.S. AD cases filed from 1980 through 1990.

Type of case	Number of firms in cases	FDI during case or within 3 years of case	FDI more than 3 years after the case	Total tariff-jumping FDI cases
<u>All Nonaffirmative</u>	376	16 (4.3 %)	8 (2.1 %)	24 (6.4 %)
Negative	239	10 (4.2 %)	5 (2.1 %)	15 (6.3 %)
Terminated	122	1 (0.8 %)	1 (0.8 %)	2 (1.6 %)
Suspended	15	5 (33.3 %)	2 (13.3 %)	7 (46.7 %)

NOTES: All measures of FDI refer to FDI by firm in the product subject to the associated U.S. AD investigation. Percentages in brackets are with respect to total “number of firms in cases” for the associated type of case. The final column, “Total tariff-jumping FDI cases,” is the total of the previous two columns for the associated investigation decision. See data appendix for more details on tariff-jumping identification and data sources.

Table 3: Descriptive statistics of variables.

Variables	Mean	Standard Deviation	Median	Minimum	Maximum
<u>Dependent Variable:</u> FDI	0.122	0.328	0.000	0.000	1.000
<u>Regressors:</u>					
AD duty (in decimal form)	0.187	0.335	0.015	0.000	2.592
Import value (in millions of dollars)	0.014	0.036	0.004	0.000	0.696
Less-developed country	0.529	0.499	1.000	0.000	1.000
Multinational firm	0.270	0.444	0.000	0.000	1.000
Plant-level scale economies (in thousands of employees)	0.162	0.173	0.128	0.007	0.681

NOTES: FDI refers to FDI by firm in the product subject to the associated U.S. AD investigation. See data appendix for more details on data construction and sources.

Table 4: Marginal effects from probit estimation of FDI likelihood, 1980-1990.

Explanatory Variables	Base Specification (1)	Base Specification with Industry Dummies (2)	Japanese Variables Included (3)	Elimination of Poor Import Value Data (4)	Elimination of Terminated Cases (5)
Constant	- 0.125** (0.026)	- 0.097** (0.025)	- 0.110** (0.029)	- 0.091** (0.029)	- 0.111** (0.033)
AD duty	0.074** (0.020)	0.070** (0.020)	0.060** (0.020)	0.050** (0.019)	0.063** (0.024)
Import value	- 0.101 (0.159)	- 0.268 (0.173)	- 0.353 (0.204)	0.046 (0.176)	- 0.057 (0.279)
Less-developed country firm	- 0.065** (0.015)	- 0.056** (0.015)	- 0.049** (0.015)	- 0.043** (0.014)	- 0.056** (0.018)
Multinational firm	0.118** (0.031)	0.095** (0.023)	0.096** (0.022)	0.082** (0.022)	0.110** (0.029)
Plant-level scale economies	- 0.084* (0.040)	- 0.063 (0.041)	- 0.051 (0.044)	- 0.065 (0.039)	- 0.048 (0.053)
Japanese firm			0.001 (0.015)	0.004 (0.013)	0.014 (0.019)
Japanese firm * AD duty			0.026 (0.026)	0.007 (0.023)	- 0.005 (0.030)
Industry Dummies	No	Yes	Yes	Yes	Yes
Chi-squared	258.39**	287.45**	290.39**	225.24**	212.23**
Observations	792	792	792	707	585

NOTES: Standard errors are in parentheses, with ** and * denoting statistical significance (two-tailed test) at the 1 and 5 percent levels, respectively.

Table 5: Frequencies of actual and predicted outcomes from probit estimates of FDI, 1980-1990.

Actual Outcomes	Predicted Outcomes		
	FDI	No FDI	TOTAL
FDI	41	56	97
No FDI	18	677	695
TOTAL	59	733	792

Table 6: Descriptive statistics of variables for affirmative case observations used in multinomial logit estimation.

Variables	Mean	Standard Deviation	Median	Minimum	Maximum
<u>Dependent Variable:</u> Firm's decision when facing AD duty	0.861	1.043	1.000	0.000	3.000
<u>Regressors:</u> AD duty (in decimal form)	0.343	0.390	0.204	0.000	2.592
Import value (in millions of dollars)	0.017	0.045	0.054	0.000	0.696
Less-developed country	0.538	0.499	1.000	0.000	1.000
Multinational firm	0.306	0.461	0.000	0.000	1.000
Plant-level scale economies (in thousands of employees)	0.134	0.139	0.088	0.007	0.550
USDOC use of BIA	0.267	0.443	0.000	0.000	1.000

NOTES: The dependent variable can take four possible values: "0" for no action; "1" for administrative review only, "2" for FDI only, and "3" for both FDI and administrative review. See data appendix for more details on data construction and sources.

Table 7: Marginal effects from multinomial logit estimates of firm responses to U.S. AD duties, 1980-1990.

Explanatory Variables	No Action	Admin. Review Only	FDI Only	Both Review and FDI
Initial AD duty	- 0.149** (0.082)	0.112 (0.073)	0.006 (0.025)	0.030 (0.038)
Import value	0.834 (0.623)	0.620 (0.515)	- 0.385 (0.274)	- 1.069 (0.551)
Less-developed country	0.294** (0.044)	0.036 (0.040)	- 0.151** (0.027)	- 0.180** (0.026)
Multinational firm	- 0.156* (0.080)	- 0.209** (0.074)	0.128** (0.040)	0.237** (0.047)
Plant-level scale economies	0.922** (0.192)	- 0.041 (0.177)	- 0.356** (0.114)	- 0.525** (0.121)
USDOC's use of BIA.	0.251** (0.073)	- 0.173* (0.069)	- 0.011 (0.024)	- 0.068 (0.039)

NOTES: The sample is the 431 firm- and product-level observations that were subject to affirmative U.S. AD investigations and duties. Standard errors are in parentheses, with ** and * denoting statistical significance (two-tailed test) at the 1 and 5 percent levels, respectively.

Table 8: Frequencies of actual and predicted outcomes from multinomial logit estimates of firm responses to U.S. AD duties, 1980-1990.

Actual Outcomes	Predicted Outcomes				TOTAL
	No Action	Admin. Review Only	FDI Only	Both Review and FDI	
No Action	186	13	3	10	212
Admin. Review Only	102	13	0	8	123
FDI Only	9	1	9	21	40
Both Review and FDI	9	3	7	37	56
TOTAL	306	30	19	76	431

Table 9: Basic model's predictions across various scenarios.

Various scenarios	No Action	Admin. Review Only	FDI Only	Both Review and FDI
Basic model	49.75 %	26.85 %	9.61 %	13.79 %
If <i>all</i> firms are multinational.	40.92 %	11.96 %	15.48 %	31.64 %
If <i>no</i> firms are multinational.	57.31 %	34.74 %	4.81 %	3.14 %
If <i>all</i> firms from less-developed countries.	62.26 %	26.70 %	2.62 %	8.42 %
If <i>no</i> firms from less-developed countries.	38.36 %	30.60 %	14.26 %	16.78 %
If USDOC used BIA in <i>all</i> cases.	64.92 %	17.75 %	8.15 %	9.18 %
If USDOC used BIA in <i>no</i> cases.	44.50 %	30.40 %	9.74 %	15.37 %

Table 10: Marginal effects from multinomial logit estimates of firm responses to U.S. AD duties, 1980-1990 - controlling for a Japanese-specific effect.

Explanatory Variables	No Action	Admin. Review Only	FDI Only	Both Review and FDI
Initial AD duty	- 0.187* (0.086)	0.110 (0.078)	0.024 (0.026)	0.053 (0.035)
Import value	0.286 (0.567)	0.395 (0.508)	- 0.305 (0.266)	- 0.377 (0.352)
Less-developed country	0.306** (0.047)	0.029 (0.042)	- 0.159** (0.030)	- 0.176** (0.027)
Multinational firm	- 0.171* (0.085)	- 0.201* (0.080)	0.138** (0.043)	0.235** (0.048)
Plant-level scale economies	0.892** (0.191)	- 0.072 (0.179)	- 0.356** (0.112)	- 0.468** (0.106)
USDOC's Use of BIA.	0.240** (0.073)	- 0.179** (0.069)	- 0.008 (0.024)	- 0.053 (0.032)
Japanese firm	0.133 (0.082)	0.006 (0.079)	- 0.035 (0.022)	- 0.104** (0.030)

NOTES: Standard errors are in parentheses, with ** and * denoting statistical significance (two-tailed test) at the 1 and 5 percent levels, respectively.

Table 11: Frequencies of actual and predicted outcomes from multinomial logit estimates of firm responses to U.S. AD duties, 1980-1990 - controlling for a Japanese-specific effect.

Actual Outcomes	Predicted Outcomes				
	No Action	Admin. Review Only	FDI Only	Both Review and FDI	TOTAL
No Action	189	10	8	5	212
Admin. Review Only	102	12	1	8	123
FDI Only	10	1	12	17	40
Both Review and FDI	10	2	7	37	56
TOTAL	311	25	28	67	431

Data Appendix

Data for **tariff-jumping FDI** was gathered from a variety of sources including 1) *Foreign Direct Investment in the United States: Transactions*. Washington, D.C.: International Trade Administration, U.S. Department of Commerce, various volumes, 2) Arpan, Jeffrey S., and Ricks, David A. *Directory of Foreign Manufacturers in the United States*. Atlanta: Georgia State University Business Press, various volumes, 3) *Directory of Foreign Firms Operating in the United States*. New York, NY: Uniworld Business Publications, various volumes, 4) various volumes of state industrial/manufacturer's directories published by Harris Publishing Co. (later Harris InfoSource). Twinsburg, OH, Harris Publishing Co., and 5) *Ward's Business Directory*. Detroit, MI, Gale Research, various issues. I also supplemented these sources with *Japan's Expanding U.S. Manufacturing Presence*. Washington, DC: Japan Economic Institute (JEI), various issues, for confirming tariff-jumping FDI by Japanese firms. I thank Keith Kead and John Ries for providing me with an electronic copy of the 1990 publication of this document. Finally, I was able to gather considerable detail and confirmations through searches of the Lexis-Nexis database and companies webpages.

Data on 1) **whether the firm requests an administrative review**, 2) **the USDOC's use of BIA** and 3) **the initial AD duty** (*ad valorem* rates) are publicly available from *Federal Register* notices connected with the case. However, I thank James DeVault for sharing a database that had much of this information already collected for my sample period.

Data for **the value of the subject product** in an AD case can be gathered from the USITC reports connected with each specific case, provided there are enough firms so that proprietary firm-level data are not revealed by the aggregate number. This is true for approximately 80 percent of the cases in my sample. Using this information, I assume equal market shares and define the firm's value of subject product as the case value of the subject import (in billions of U.S. dollars) divided by the number of firms. In the other cases I do not have these data and therefore I construct estimates of the subject import by first gathering data on the tariff line item codes of the investigated product (which are reported in *Federal Register* notices by both the USITC and USDOC). Then, using the NBER Trade Database, Disk 1: U.S. Imports, 1972-1994, produced by Robert Feenstra, I estimate the value of the subject product as the customs value of tariff line-item code from the Japan the year before the filing of the case and divide by the number of firms in the case to get the regressor for each firm-level observation. This latter estimation of U.S. sales is similar to Prusa (1997). There were a number of cases for which the subject product covered just portions of tariff-line item codes so that I was not confident this method would provide a reasonable estimate. In these cases, there are missing values for the observation.

Plant-level scale economies is calculated as the average number of employees (in hundreds) of the for a plant in the U.S. 4-digit Standard Industrial Classification (SIC) industry of the investigated product. These data are gathered from the 1987 U.S. *Census of Manufactures*.

The **firm's multinational status** was determined by by a number of directories that list multinational firms worldwide, including 1) *Moody's International Manual*. New York: Moody's Investor's Services, 1998, 2) Hoopes, David S. (Editor), *Worldwide Branch Locations of Multinational Companies*. Detroit, MI: Gale Research, Inc., 1994, and 3) Sanchez, James Joseph (Editor). *Asia Pacific Corporate Organization*. Tuscon, AZ: Aristarchus Group, 1990.

Finally, a firm was considered to be from a **less-developed country** unless it was based in Australia, Austria, Belgium, Canada, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, Switzerland, or the United Kingdom.