

Antidumping Investigations and the Pass-Through of Antidumping Duties and Exchange Rates

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Economists have devoted substantial work to understanding the pricing behavior of exporting firms in the presence of variations in the exchange rate. Much of this research has focused on the concept of exchange rate pass-through—how a firm alters the price of an exported good, denoted in the currency of the importing country, to a change in the exchange rate.¹ Curiously, there has been little research on the impact of trade protection policies on exchange rate pass-through or, more fundamentally, on the pass-through of trade protection instruments. Exceptions include Feenstra (1989), Ann Harrison (1992), and Knetter (1994). Feenstra

(1989) evaluates the hypothesis that ad valorem tariffs and exchange rate changes lead to symmetrically identical pass-through to prices, while Harrison (1992) and Knetter (1994) examine the potential impact of quantitative restrictions on exchange rate pass-through (or pricing-to-market).

In this paper we explore for the first time the impact of antidumping (AD) investigations on pass-through of both AD duties and exchange rates. Arguably the most heavily used trade restriction in recent years, AD protection policies lead to AD duties when a foreign firm is found to sell a good in a domestic market at “less than fair value,” i.e., dumping, and causing “material injury” to domestic firms. An important difference relative to standard tariffs is that AD duties are potentially recalculated each year by the U.S. Department of Commerce (USDOC) based on the firm’s previous-year pricing decisions in what are known as administrative reviews. The administrative review process implies that AD duties are endogenously determined over time by the firms’ pricing decisions in both its export market and own home market. This endogeneity has important implications for both pass-through of the AD duty and exchange rate pass-through. In fact, we first show that optimal behavior by the firm may imply pass-through of up to 200 percent of the initial AD duty. Second, we find that AD duties and the resulting administrative review process may substantially alter exchange rate pass-through elasticities.

To test the effect of AD investigations on pass-through of AD duties and exchange rates, we examine monthly panel data of 345 iron and steel imports from Canada to the United States over the period 1989 to 1995. Our panel includes products that were involved in U.S. AD iron and steel cases filed in 1992, as well as other closely related products that were not involved or received negative determinations. The period from 1989 to 1995 is judicious because it includes the complete timeline of events during

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¹ A one-to-one response is defined as complete pass-through, and a less than one-to-one response is partial or incomplete pass-through. Empirical studies tend to find incomplete pass-through, with the fraction averaging 60 percent (Pinelopi Koujianou Goldberg and Michael M. Knetter, 1997 p. 1250). Differences in estimates of exchange rate pass-through are typically explained by industry characteristics such as market power (e.g., Knetter, 1993; Robert C. Feenstra et al., 1996; Anne Gron and Deborah L. Swenson, 1996; Jiawen Yang, 1997), and shifts in exchange rate expectations or hysteresis effects (e.g., Richard Baldwin, 1988; Kenneth A. Froot and Paul D. Klemperer, 1989). As surveyed in Goldberg and Knetter (1997), pass-through is closely related to two other literatures: pricing-to-market (i.e., how an exporting firm price discriminates across destination countries given changes in exchange rates) and the law-of-one-price across international markets.

the AD investigations. We choose U.S. iron and steel imports from Canada because many U.S. AD investigations involved iron and steel, and more iron and steel is imported into the United States from Canada than any other country except Japan.²

Consistent with our predictions, we find that pass-through of the AD duty is more than complete, as our estimates indicate pass-through of 160 percent of the AD duty. Also as predicted, our estimates show significant differences in exchange rate pass-through between those products that received an AD duty and those that did not. We find that exchange rate pass-through rises dramatically for products once they become subject to final AD duties, whereas exchange rate pass-through for products that did not receive an AD duty remains constant over our entire sample.

Thus, our analysis shows that the pricing behavior of exporting firms is substantially altered by the imposition of AD duties, which has important implications for many previous studies of exchange rate pass-through or pricing-to-market in U.S. manufacturing industries.³ Indeed, since 1980 there have been over 800 AD investigations, with approximately half of these cases ruled affirmative against foreign imports, leading to significant AD duties. In addition to steel and steel-related products, these AD cases have spanned important manufacturing sectors including chemicals, semiconductors, computers, communications equipment, ball bearings, and other industrial machinery. In fact, Michael P. Gallaway et al. (1999) con-

cludes that duties from U.S. AD investigations, in combination with countervailing duties, are second only to the Multifiber Arrangement quotas in terms of net welfare costs to the U.S. economy.

The remainder of the paper is organized as follows. The next section summarizes the administration of U.S. AD investigations. Section II develops our primary hypotheses about the impact of antidumping investigations on the pass-through of antidumping duties and the exchange rate. The rest of the paper tests these hypotheses using the case of the 1992 U.S. AD investigations of Canadian iron and steel products. Thus, Section III presents a brief history of these U.S. AD investigations, Section IV presents our empirical methodology, including discussion of the data, and Section V presents and evaluates our empirical results. The final section summarizes our conclusions.

I. Overview of U.S. Antidumping Investigation Procedures

The U.S. antidumping laws are administered by the U.S. Department of Commerce (USDOC) and the U.S. International Trade Commission (USITC), each with distinct roles in the process. When a petition is filed, the USDOC's role is to calculate whether firms exporting to the United States are selling the product here at less than "normal" or "fair" value. For each case, the USDOC calculates an ad valorem dumping margin equal to the percentage difference between the U.S. transaction prices they observe and fair value. The USITC concurrently determines whether the relevant U.S. domestic industry has been materially injured, or is threatened with material injury, due to the imports subject to its investigation.

Figure 1 presents a timeline of the standard U.S. AD investigation. The USDOC and USITC each make preliminary and final determinations during the case. If and when 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 equal to the preliminary margin determined by the USDOC for each entry of the subject product. This requirement stays in effect until either the USDOC or the USITC makes a negative final determination. If an affirmative *final* determination is

² In 1992, 24 percent of total U.S. iron and steel imports (SIC 3312) came from Japan and 23 percent came from Canada. The next largest import source was Germany with about 8 percent import-market share. In addition, Canada was also one of the few significant import sources not subject to U.S. steel VRAs leading into the time period of our data (U.S. International Trade Commission, 1994 p. 90), which substantially eases concerns that these quantitative restrictions could confound our estimates.

³ While this paper is the first to examine pass-through issues connected with AD investigations and duties, other previous studies have also shown that AD protection leads to many consequences beyond the standard effects of an ad valorem tariff. These studies include Robert M. Feinberg (1989), James E. Anderson (1992, 1993), Robert W. Staiger and Frank A. Wolak (1994), Corinne M. Krupp and Patricia S. Pollard (1996), B. Peter Rosendorff (1996), and Thomas J. Prusa (1997).

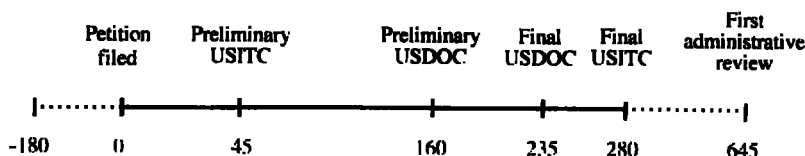


FIGURE 1. TIME LINE OF STANDARD U.S. ANTIDUMPING INVESTIGATION (DAYS FROM FILING OF PETITION)

made by both the USITC and USDOC, then the USDOC issues an AD order to levy an AD duty equal to the estimated dumping margin on the subject product.

The dumping margin calculation for both the preliminary and final USDOC determinations normally defines "fair value" as the investigated firm's own home market price for the same good.⁴ The USDOC typically compares sales transactions that occurred in both markets for the six months previous to the date the petition is filed (indicated by the dotted line before the petition date in Figure 1) to determine both the preliminary and final dumping margins. Importantly, the USDOC calculates the dumping margin based on the difference between the *ex-factory* foreign export and home price of the good—the theoretical price of the product as it leaves the production factory. Thus, in order to make this calculation, the USDOC subtracts off transport, tariff, and other costs from the observed price in the United States to derive an *ex-factory* foreign export price. This will be crucial to understanding our discussion of the pass-through of the AD duty in Section II below. Additionally, in order to have comparable prices, the USDOC converts the U.S. price into the investigated firm's home-country currency using (when available) the daily bilateral exchange rate of the subject country at the time of the U.S. transactions. This has implications for exchange rate pass-through, also discussed in Section II.⁵

⁴ This is the definition we use in the rest of the paper and the one that is applicable to the U.S. AD cases we examine empirically. However, in cases where home market sales are inadequate, then the USDOC bases fair value on sale prices in third-country markets. If third-country sales are inadequate, then fair value is based on a constructed value for fair value using the investigated firm's manufacturing costs, selling, general and administrative costs, profits and packaging costs.

⁵ However, when a daily exchange rate represents a sizeable fluctuation, defined as a 2.25 percent difference from a rolling average of rates for the past 40 business days

While the initial dumping margin calculation is not straightforward, the ultimate AD duty faced by the investigated firm is even more complicated by ensuing procedures followed by the USDOC. In particular, once an AD duty is applied to a product, the importer must pay U.S. Customs a cash deposit equal to the ad valorem AD duty 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 the 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. Every year, on the anniversary of the date the final AD duties were assessed, the USDOC asks for any requests by interested parties for an administrative review of a firm's AD duty. A request may come from the previously investigated firm which faces the duty or an interested U.S. firm or organization. If a request is made, the USDOC recalculates the dumping margin using transactions from the 12 months immediately preceding the administrative review request, which is represented in Figure 1 by the dotted line between the final USITC determination and the first administrative review. Once the USDOC calculates a dumping margin over this period, an AD duty equal to the newly calculated dumping margin replaces any previously existing AD duty. If a review determines that the margin during the review period is different from the previous margin used as a basis for the import-

(referred to as the "benchmark rate"), the USDOC then uses the "benchmark rate." In the 1992–1993 U.S. steel cases we examine, the USDOC used daily exchange rates with no adjustment to a benchmark rate.

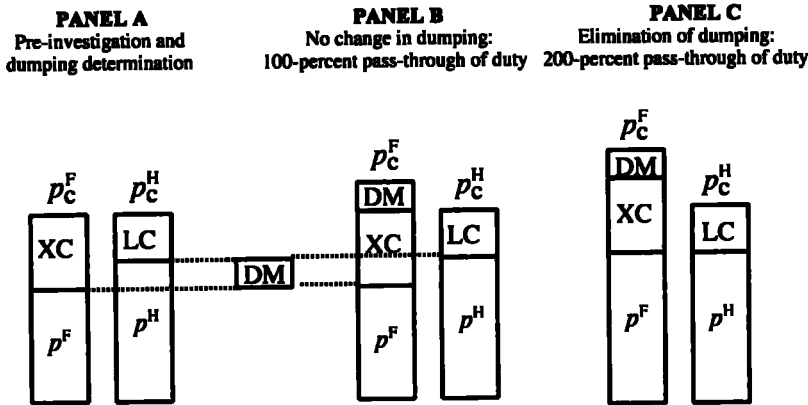


FIGURE 2. DUMPING MARGIN DETERMINATION AND EFFECTS ON CONSUMER PRICES

er's cash deposit, a bill (or refund) in the amount of the difference plus interest is assessed (or rebated). The administrative review process thus allows investigated firms to discontinue any dumping into the United States and subsequently avoid the duty.

II. Hypotheses

Unlike standard ad valorem tariffs, the magnitude of the firm's pass-through of an AD duty directly affects the level of the AD duty in the future because of the administrative review process. A forward-looking firm will realize that the effective AD duty it faces over the coming period entirely depends on its pricing decisions, which form the basis of the dumping calculation in the administrative review, not the current AD duty at the beginning of the period. However, because of the way the USDOC defines and determines dumping, 100-percent pass-through of an AD duty does not imply that the firm will receive a lower future AD duty. The key to understanding this is that the USDOC computes the dumping margin as the difference between the home and foreign export price *before* transport, tariff, AD duty, and other costs are included in the price of the product. That is, the USDOC calculates the dumping margin based on the difference between the *ex-factory* foreign export and home prices of the product, as described in the previous section. This means that if the investigated firm does not alter its home price, one would have to see the foreign con-

sumer price rise by 200 percent in order for the firm to eliminate the AD duty.

To show this more clearly, Figure 2 depicts the components that make up the final consumer price in each market. The two columns in Panel A of Figure 2 depict the consumer prices in the foreign (export) and home markets, p_C^F and p_C^H , respectively, before an antidumping investigation. The foreign consumer price is comprised of the price of the product as it leaves the foreign factory (p^F) plus the costs of bringing the product to the foreign consumer (XC), including transportation costs, insurance, and standard tariffs. If the product is handled by an independent importer/distributor in the foreign country, their markup (or profit margin) would also be included in XC. Likewise, the home consumer price is comprised of the price of the product as it leaves the factor (p^H) plus additional local costs of providing the product to the home consumer (LC). The USDOC nets out XC and LC from the respective consumer prices, in order to calculate the dumping margins as $p_C^H - p_C^F$. Thus, in the example in Panel A, there is a dumping margin (DM) even if the final consumer prices are equal in the two markets.

Panel B and C of Figure 2 then show two possible ways that a firm may pass through the AD duty. Panel B shows the case where the pass-through of the AD duty by the firm is 100 percent. However, because the USDOC will net out the AD duty in dumping calculations, the dumping margin relative to Panel A has not changed and future administrative reviews will

continue to find an identical dumping margin. Panel C shows the case in which the firm can eliminate the dumping margin for future administrative reviews by passing-through the AD duty 200 percent, while keeping the home price constant. In Panel C, the firm first raises p^F by the dumping margin to equal p^H , then includes the dumping margin in the final consumer price again to reflect the paid AD duty. Of course, the firm may employ some combination of raising p^F and lowering p^H to help eliminate the duty, in which case pass-through to the foreign consumer price will be less than 200 percent, even if we observe elimination of the duty.

The administrative review process connected with AD duties also has the potential to significantly alter exchange rate pass-through by firms facing these AD duties. The reason is that the USDOC compares the investigated firm's home price to its foreign price after translating the foreign price into the home currency. Thus, exchange rate movements are an important consideration for a firm that is choosing optimal prices in anticipation of an administrative review. In other words, the effective AD duty faced by the firm is a function not only of the prices in both the home and foreign markets, but also the exchange rate. In Blonigen and Haynes (1999) we present a formal pricing model that demonstrates that the existence of an AD duty (with the administrative review process that accompanies it) theoretically changes exchange rate pass-through of the firm, creating a possible structural break in exchange rate pass-through once an affirmative AD decision has been reached. The model finds that exchange rate pass-through with an AD duty may be higher or lower than exchange rate pass-through when the firm does not face an AD duty. The direction and magnitude of the shift in pass-through depends on the demand conditions in both markets (home and foreign), as well as the firm's cost function. In fact, it can be shown that exchange rate pass-through may be either higher or lower once a firm faces an AD duty even for the simple case of linear demands and constant marginal cost.

A related issue discussed in Blonigen and Haynes (1999) is the possibility of asymmetric exchange rate pass-through from AD investigations. In their model, a firm that alters prices to completely eliminate the AD duty finds itself at

a corner solution, where the magnitude of exchange rate pass-through then depends on the direction of the exchange rate movement. Alternatively, a more complicated dynamic model of asymmetric pass-through could be developed where firms attempt to mitigate the impact of an AD duty by increasing exchange rate pass-through (perhaps to unity) when the exchange rate is expected to appreciate in the future, and by decreasing (perhaps to zero) exchange rate pass-through when the exchange rate is expected to depreciate in the future. Thus, an additional hypothesis is that AD administrative reviews may lead to asymmetric exchange rate pass-through.

In summary, this section presents three implications of AD investigations and duties for pass-through of AD duties and exchange rate movements. First, pass-through of the AD duty to the foreign consumer price may be up to 200 percent. Second, there is structural change in the exchange rate pass-through elasticity once AD duties are imposed. Third, under special circumstances, there is asymmetric exchange rate pass-through after AD duties are imposed.

III. A Brief History of the U.S. AD Cases in Iron and Steel Products Filed in 1992

Our analysis of how AD investigations may affect exchange rate pass-through focuses on the U.S. antidumping investigation of imported iron and steel products that were filed in 1992 and its subsequent effect on U.S.-imported Canadian steel prices. Figure 3 outlines a timeline of important events during the U.S. 1992–1993 AD steel cases. On June 8 of 1992, a group of U.S. steel producers filed an antidumping petition against a wide range of iron and steel products covered under chapter 72 of the Harmonized Tariff System (HTS) involving foreign producers from 20 different countries.⁶ On February 4, 1993, the USDOC announced preliminary dumping margins which ranged from 0.88 percent to 109.22 percent, with an average margin across the country-product cases of 33.23

⁶ The investigated foreign firms were from Argentina, Australia, Austria, Belgium, Brazil, Canada, Finland, France, Germany, Italy, Japan, Korea, Mexico, the Netherlands, Poland, Romania, Spain, Sweden, Taiwan, and the United Kingdom.

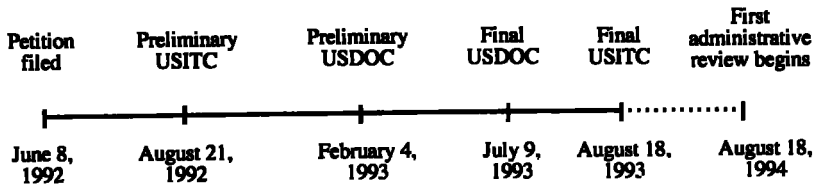


FIGURE 3. TIME LINE OF U.S. ANTIDUMPING INVESTIGATION OF STEEL PRODUCTS, 1992-1994

percent. Thus, effective February 4, 1993, investigated firms were required by U.S. Customs to post a cash deposit, a bond, or other security equal to the preliminary dumping margin for all subject merchandise subsequently imported into the United States. On July 9, 1993, the USDOC issued its final dumping margins which were very similar to its preliminary margins. On August 18, 1993, the USITC ruled its final determination. Unlike the USDOC, the USITC did not rule affirmative on all remaining cases. Of the 42 remaining country-product cases, the USITC ruled affirmative on 20 cases.

As described in Section II, calculation of antidumping duties is an ongoing process through the administrative review procedures followed in U.S. AD cases. With respect to the steel cases, the majority of firms from Korea, Canada, Australia, Finland, Sweden, Germany, and the Netherlands requested administrative reviews of their dumping margins on the first anniversary of the case in 1994. While the petitions were initiated by the foreign firms, the original domestic petitioning steel firms also participated heavily in these administrative reviews. With the exception of Broken Hill Propriety Co. from Australia, all reviewed firms received substantially lower margins, with many reduced to almost zero. This suggests that these firms changed their behavior to eliminate any dumping over the period reviewed.

The Canadian firms were in the group of firms that asked for administrative reviews and, as shown in Table 1, all reduced their AD duty to less than 2 percent by the first administrative review. This means the Canadian firms were aggressive in eliminating the AD duty and suggests they are an appropriate focus for our examination of altered pricing behavior from the AD investigation and administrative review process. It is important to note that, although the

first administrative review began in August 1994, the final determination of new AD duties from this first review was not announced until March 1996.⁷ Thus, we assume in our analysis below that Canadian firms faced the same market conditions and incentives from the end of the AD case in August 1993 through at least the end of 1995, the end of our data sample.

IV. Empirical Implementation

A. Specification and Tests

As detailed below, our bilateral sample is disaggregate U.S. iron and steel imported products from Canada. To explore our hypotheses with these data, we extend a standard pass-through equation (e.g., Feenstra, 1989) to include AD duties and investigations. Suppressing for simplicity the time and cross-section subscripts, our initial estimation equation for the U.S.-Canadian sample is equation (1) (at the bottom of the following page), where expected signs of coefficients are summarized above the regressors; p^{US} is the U.S. dollar price of U.S. iron and steel imports from Canada; e is the U.S. dollar price of the Canadian dollar; t_0^{AD} is the initial antidumping duty; t^T is the ad valorem MFN tariff; w is an aggregate of home factor costs proxied by Canadian producer costs in Canadian dollars; q^{US} is U.S. dollar price of the U.S. substitute good; I^{US} is U.S. expenditures

⁷ The U.S. steel AD determinations with respect to Canadian firms were also being reviewed by a binational Canada-U.S. panel, as authorized by the U.S.-Canada Free Trade Agreement, from September 1993 through 1996. Our reading of the various *Federal Register* notices connected with the case suggest these binational panel reviews led to no significant changes in the U.S. steel case determinations during our sample period.

TABLE 1—PROGRESSION OF AD DUTIES OVER TIME FROM ADMINISTRATIVE REVIEW PROCESS IN THE 1992–1993 U.S. STEEL CASES INVOLVING CANADA

Product	Investigation		First review period of investigation (February 4, 1993–July 31, 1994)		Second review period of investigation (August 1, 1994–July 31, 1995)	
	Duty ^a	Method ^b	Duty ^a	Method ^b	Duty ^a	Method ^b
Cut-to-length plate						
IPSCO	1.47	HM	1.65	HM/CV	0.59 ^d	HM
Stelco, Inc.	68.70	HM	0.19	HM/CV	0.55	HM
Continuous Color Cast	61.95	all other	1.96	HM/CV	1.31 ^d	HM
Corrosion-resistant						
Dofasco	1.69 ^c	HM				
Stelco, Inc.	28.27	HM	0.92	HM/CV	0.00	HM
Algoma Steel, Inc.	22.29	all other	1.82	HM/CV	0.37	HM
Manitoba Rolling Mills	22.29	all other	0.02	HM/CV	WD	

Source: Federal Register notices, various issues.

^a Reported as percentage. WD indicates that the firm withdrew its request for a review.

^b The method used to determine fair market value by USDOC. "HM" indicates they used home market transactions, "HM/CV" indicates USDOC used home market transactions, but also ruled out some as "below cost" using a constructed value method, and "all other" indicates that a dumping margin was not calculated for the specific firm at the time of the investigation, and thus, the "all other" margin (a trade-weighted margin of the firms for which a dumping margin was calculated) was applied.

^c Initial duty, calculated by USDOC, was 10.89, but ministerial errors led to correction and this lower duty as of March 1994.

^d Duty that was amended subsequent to final determination due to ministerial errors. In both cases the correction was very small.

on steel in U.S. dollars; and I^{CAN} is Canadian expenditures on steel in Canadian dollars.

Inclusion of the AD duty variable, $\ln(1 + \tau_0^{\text{AD}})$, allows examination of the AD duty pass-through, which we predict may be as high as 200 percent (or a coefficient of 2 in our empirical model). One additional consideration is the application of "preliminary" AD duties for a few months before the case was finally determined and final AD duties were assessed. We separately include these "preliminary" AD duties in our framework, but expect pass-through may not be as high as pass-through with the final AD duties, due to the uncertainty surrounding the ultimate determination of the case while the preliminary AD duties were in place.

The coefficient on the exchange rate is our estimate of exchange rate pass-through. We pre-

dict that exchange rate pass-through is potentially altered in a significant manner once a firm receives AD duties because of the administrative review process that makes the AD duty endogenous with the firm's pricing decisions. Our sample of iron and steel products has variation across a number of dimensions that allows us to test for such a structural break. First, our sample includes products that were investigated and found affirmative, hence received a final AD duty, and those products that were identified nonaffirmative and did not receive a final AD duty. Second, our sample covers a significant time period prior to the imposition of the final duty, as well as a significant time period after its imposition. For the affirmative products, we expect to find a structural break in the exchange rate pass-through coefficient at the

$$(1) \quad \ln p^{\text{US}} = f[\ln e, \ln(1 + \tau_0^{\text{AD}}), \ln(1 + \tau^{\text{T}}), \ln w, \ln q^{\text{US}}, \ln I^{\text{US}}, \ln I^{\text{CAN}}]$$

time the final AD duty is imposed. For the nonaffirmative products, however, we expect that the exchange rate pass-through coefficient remains constant throughout our sample and equal to the exchange rate pass-through coefficient for the affirmative products prior to the structural break. We are also able to test for asymmetric exchange rate pass-through responses for the affirmative products by separating the exchange rate pass-through effect into appreciation and depreciation movements for the period after the AD duties are imposed.

B. Data

To test our model we examine monthly data on U.S. imports of Canadian iron and steel products from 1989 through 1995. Examination of the Canadian case is appropriate for a number of reasons. Canada was one of the largest import sources of iron and steel for the United States during this time period and was one of the source countries with large volumes of trade involved in the U.S. AD steel investigations and subsequent AD duties. The evidence from the duty determinations in administrative reviews after the case suggest that the involved Canadian firms altered behavior substantially to reduce the AD duty (see Table 1). Furthermore, Canadian steel products were not subject to any U.S. VRAs before or during the time period of our data. Finally, we were able to gather more detailed data to control for Canadian producer costs than for other source countries.⁸

We collected monthly data for all 10-digit Canadian imports of iron and steel products covered under HTS codes 7201 through 7219.⁹ The U.S. AD investigation involved a substantial number of 10-digit HTS codes from HTS 7208 through 7219. Importantly, these HTS codes cover U.S. AD iron and steel cases that received an affirmative decision and AD duty, and those that either received a negative decision and no duty or were not involved in the cases.

Identification of AD effects is also facilitated by having monthly time-series data for each

product beginning three years before the AD case was filed to almost two years after the final determination. As described in Section III, the U.S. AD steel investigations began in June 1992 and concluded in August 1993. The first administrative review occurred in August 1994 and examined transactions over the period of February 1993 through July 1994. These events occur in the middle of our 1989–1995 time-series data. We begin the sample in January 1989 when data by HTS product codes first became available in the United States (rather than by the formerly used TSUSA system). We end our sample in December 1995 because there were significant changes in the U.S. iron and steel HTS product codes that took effect in January of 1996, and we were not able to confidently concord these changes into the original HTS codes in our sample.

Our overall sample includes 345 10-digit HTS product codes. About two-thirds of the products do not have transactions for every month in our sample. However, over 70 percent of our observations are by products with transactions in at least three-quarters of the months. In our analysis below, we also estimate our model using only the 98 product codes that have complete time series. This subset allows us to address potential statistical concerns related to time-series properties of our data in a more explicit fashion.¹⁰

Our dependent variable is the logarithm of the product's U.S. price inclusive of the AD duty and the tariff. Our U.S. price variable is constructed as monthly unit values for each of our products from official U.S. Customs data multiplied by one plus any applicable AD duty rate or ad valorem tariff rate. We note that an

¹⁰ One concern is whether the missing values are primarily due to cessation of imports by the affirmative products after the AD duties are imposed. While the fraction of affirmative products with positive values in any given month after the AD duties are imposed are lower than before the case (57.3 percent compared to 65.7%), this is not a precipitous decline. In addition, the fraction of products with positive trade values for nonaffirmative products is quite similar to that for the affirmative products across the sample: approximately 60 percent. Finally, when we turn to the 98 product codes that have complete time series the fraction of product codes that are affirmative products (12 out of 98) is similar to that for the full sample (49 out of 345).

⁸ As Knetter (1993) and Goldberg and Knetter (1997) point out, it is important to control as precisely as possible for cost shocks in empirical pass-through studies.

⁹ A data appendix, available from the authors upon request, details sources and construction of our variables.



FIGURE 4. U.S.-CANADIAN EXCHANGE RATE, 1989-1995

ideal data set would have data by product and by firm because our product-only data encompasses activity by potentially numerous firms, each with separate AD duties. The USDOC calculates AD duty rates by product and by firm, but also reports a trade-weighted average of the firm-specific AD duties by product which is called the "all other" duty, because it is applied to any new firm from the source country that enters and exports the subject product. We use this trade-weighted "all other" AD duty to construct our dependent variable.¹¹

One focus in this paper is the pass-through of exchange rate changes on prices before and after the conclusion of AD investigations. Figure 4 shows the movement of the U.S. dollar value of the Canadian dollar, end-of-month, for our sample period, and the beginning and end of the U.S. AD steel investigations. From 1989 to the beginning of 1992, the Canadian dollar was fairly

stable, with a slight appreciation. This was followed by a significant depreciation of the Canadian dollar in 1992 and 1993, with a leveling off in 1994 and 1995. While the general trends in the exchange rate vary in the pre-investigation, investigation, and post-investigation periods, each subperiod experiences both increases and decreases of the exchange rate.

Besides the logarithm of the exchange rate, other explanatory variables include the logarithms of the AD duty, tariff, Canadian producers' costs, the U.S. domestic substitute price, and Canadian and U.S. expenditures on steel. We note that, while the exchange rate and Canadian and U.S. iron and steel expenditure variables vary only by time, producer costs and U.S. domestic substitute prices vary by time and product. Table 2 displays descriptive statistics for our dependent variable and right-hand-side variables for both the sample of 345 products and the sample of 98 products with complete time series.

V. Results

A. Initial Estimates

In this section, we present estimates of equation (1) and several variations using weighted

¹¹ While the use of the "all other" AD duty and product-level data to estimate firm-level pass-through is a concern, information in Table 1 suggests that the firm, Stelco, Inc., was primarily responsible for the majority of U.S. imports of affected Canadian iron and steel products. To see this, Table 1 shows that the trade-weighted "all other" duty is very close to the firm-specific margin received by Stelco, Inc.

TABLE 2—DESCRIPTIVE STATISTICS OF VARIABLES FOR SAMPLE OF ALL 345 PRODUCTS AND SAMPLE OF 98 PRODUCTS WITH COMPLETE TIME SERIES

Variable	Sample of 345 products		Sample of 98 products	
	Mean	Standard deviation	Mean	Standard deviation
Logarithm of U.S. price	0.103	1.677	0.081	1.920
Logarithm of U.S. dollar price of Canadian dollar	-0.220	0.072	-0.219	0.072
Logarithm of (1 + AD duty)	0.015	0.062	0.014	0.061
Logarithm of (1 + tariff)	0.025	0.017	0.022	0.016
Logarithm of Canadian producer costs	4.671	0.086	4.667	0.085
Logarithm of U.S. domestic substitute price	4.728	0.075	4.727	0.077
Logarithm of U.S. expenditures on steel	8.674	0.116	8.671	0.115
Logarithm of Canadian expenditures on steel	6.679	0.206	6.674	0.205

Notes: The full sample has 17,449 observations, whereas the sample of 98 products with complete time series has 8,232 observations.

Sources: See data appendix, available from authors upon request.

least squares (WLS), where the weight is the customs value of the imported good. The reason for using WLS is because the volume and value of trade across the commodities is often very dissimilar. For some goods, there is modest or even zero trade for many months, and for other goods, there is substantial trade for all months. It thus seems inappropriate to weight each observation equally, since one would expect a greater variance in the residual for observations with modest trade relative to those with substantial trade. All WLS regressions include White's correction for heteroscedasticity (robust estimates), fixed-effect constants by product, and monthly dummy variables. We also report results from alternative specifications including panel-specific autocorrelation and heteroscedasticity, dynamic/lagged effects, asymmetric exchange rate effects, and threat effects.

Table 3 summarizes pass-through estimates beginning with our full panel of 345 products from January 1989 to December 1995. Column (1) reports estimates of equation (1) for the full sample (17,437 observations). All coefficients that have predicted signs are highly significant with the theoretically correct sign (only the theoretical signs on the two expenditure coefficients are ambiguous), supporting our basic pass-through specification. The coefficient on the exchange rate is 0.349, indicating significant but incomplete pass-through, and we cannot reject the hypothesis that this coefficient is equal to the coefficient on the Canadian producer cost (0.251), supporting a common re-

striction imposed in this literature. The coefficient on the AD duty variable is significant at 0.818.¹²

Columns (2) and (3) in Table 3, respectively, report pass-through estimates of equation (1) for those products that received an affirmative decision and final AD duty (2,608 observations) and estimates for the nonaffirmative products, which did not receive a final AD duty (14,829 observations). Estimates in columns (2) and (3) are very similar qualitatively to those in column (1), with the only major difference being a reduced statistical significance on most of the variables in column (2) (likely a result of the much smaller sample size). Given the strong similarity in the exchange rate pass-through coefficients in all three columns, as well as the similarity in the three AD duty coefficients, one would conclude that imposition of an AD duty has no effect on pass-through equations. In fact, this conclusion is spurious, resulting from imposing two invalid aggregation restrictions with the affirmative sample: a constant AD duty coefficient and a constant exchange rate coefficient before and after the period of final determination of the AD investigation.

¹² If one drops the AD duty variable and reestimates the column (1) specification (estimates are omitted for brevity), one obtains extremely similar estimates to those in column (1) that include the duty. One may infer from this that AD investigations and duties have no influence on exchange rate pass-through, but this inference is incorrect, as we demonstrate below.

TABLE 3—PASS-THROUGH ESTIMATES FOR U.S.-IMPORTED CANADIAN IRON AND STEEL PRODUCTS, 1989–1995.
USING WEIGHTED ORDINARY LEAST SQUARES AND FIXED EFFECTS: SAMPLE OF 345 PRODUCTS

Regressor	Full sample (1)	Affirmative sample (2)	Nonaffirmative sample (3)	Affirmative sample (4)	Nonaffirmative sample (5)
U.S. dollar price of Canadian dollar	0.349** (0.078)	0.407 (0.283)	0.381** (0.083)		
U.S. dollar price of Canadian dollar \times period <i>before</i> final determination				0.245 (0.338)	0.406** (0.079)
U.S. dollar price of Canadian dollar \times period <i>after</i> final determination				0.860** (0.316)	0.385** (0.080)
1 + AD duty	0.818** (0.051)	1.006** (0.068)	0.975** (0.081)		
(1 + AD duty) \times period <i>during</i> investigation				0.876** (0.071)	1.053** (0.085)
(1 + AD duty) \times period <i>after</i> final determination				1.626** (0.184)	
1 + tariff	1.384** (0.400)	2.337** (0.900)	1.176** (0.449)	1.563 (0.803)	1.185* (0.467)
Canadian producer costs	0.251** (0.057)	0.294 (0.215)	0.274** (0.059)	0.376 (0.228)	0.272** (0.058)
U.S. domestic substitute price	0.628** (0.101)	0.352 (0.416)	0.595** (0.099)	0.246 (0.374)	0.583** (0.103)
U.S. expenditures on steel	-0.155** (0.059)	-0.119 (0.120)	-0.154* (0.068)	-0.060 (0.109)	-0.170* (0.072)
Canadian expenditures on steel	0.219** (0.032)	0.151** (0.058)	0.234** (0.036)	0.154** (0.056)	0.239** (0.036)
R^2 :	0.99	0.82	0.99	0.82	0.99
F test:	95.37**	48.77**	62.71**	46.68**	61.89**
Sample size:	17,437	2,608	14,829	2,608	14,829

Notes: The dependent variable is the U.S. price (inclusive of the duties and tariffs) of the Canadian imported steel product. All variables are in logarithms. Robust standard errors are in parentheses.

* Significant at the 5-percent level.

** Significant at the 1-percent level.

To test our paper's hypotheses more specifically, columns (4) and (5) in Table 3 relax these two restrictions for the affirmative and nonaffirmative products. In particular, the AD duty coefficient and the exchange rate coefficient are permitted to differ in the period before the final determination (January 1989 to August 1993) relative to the period after the final determination (September 1993 to December 1995), noting that there was no duty, preliminary or final, prior to February 1993. For this specification, the coefficient on the AD duty in the period after the investigation [in column (4)] is now approximately 1.626 (or 163 percent pass-through), which is substantially greater than 100 percent pass-through, and substantially greater than the preliminary AD duty pass-through in the period during the investigation. An F test

rejects the null hypothesis that the coefficient on the AD duty after the investigation is 2 at the 5-percent significance level (F statistic = 4.10), which is likely due to the fact that the firms did not completely eliminate the duty and/or they also lowered their home price to some extent to reduce the AD duty.

Turning to exchange rate pass-through effects, estimates for the affirmative products in column (4) show that exchange rate pass-through prior to the final determination is not statistically different from zero, but becomes significant at 0.860 after the final determination. Thus, column (4) supports a dramatic structural break with the affirmative products on the exchange rate coefficient (F -test of structural change is significant at the 1-percent level), consistent with theoretical predictions. Import-

TABLE 4—PASS-THROUGH ESTIMATES FOR U.S.-IMPORTED CANADIAN IRON AND STEEL PRODUCTS, 1989–1995, USING WEIGHTED ORDINARY LEAST SQUARES AND FIXED EFFECTS: SAMPLE OF 98 PRODUCTS WITH COMPLETE TIME SERIES

Regressor	Full sample (1)	Affirmative sample (2)	Nonaffirmative sample (3)	Affirmative sample (4)	Nonaffirmative sample (5)
U.S. dollar price of Canadian dollar	0.273** (0.086)	0.292 (0.289)	0.314** (0.093)		
U.S. dollar price of Canadian dollar × period <i>before</i> final determination				0.113 (0.357)	0.473** (0.086)
U.S. dollar price of Canadian dollar × period <i>after</i> final determination				0.769* (0.301)	0.348** (0.088)
1 + AD duty	0.736** (0.052)	0.954** (0.060)	0.896** (0.089)		
(1 + AD duty) × period <i>during</i> investigation				0.858** (0.075)	1.089** (0.093)
(1 + AD duty) × period <i>after</i> final determination				1.583** (0.111)	
1 + tariff	0.986* (0.405)	2.823** (0.897)	0.518 (0.446)	1.890* (0.775)	0.663 (0.471)
Canadian producer costs	0.205** (0.066)	0.058 (0.243)	0.256** (0.063)	0.168 (0.263)	0.230** (0.061)
U.S. domestic substitute price	0.433** (0.117)	0.655 (0.482)	0.351** (0.112)	0.575 (0.443)	0.318** (0.116)
U.S. expenditures on steel	−0.098 (0.067)	−0.072 (0.131)	−0.096 (0.078)	−0.000 (0.120)	−0.162* (0.082)
Canadian expenditures on steel	0.227** (0.035)	0.167** (0.061)	0.238** (0.041)	0.160** (0.061)	0.260** (0.041)
R ² :	0.99	0.83	0.99	0.83	0.99
F test:	85.59**	53.89**	53.79**	70.48**	53.29**
Sample size:	8,232	1,008	7,224	1,008	7,224

Notes: The dependent variable is the U.S. price (inclusive of the duties and tariffs) of the Canadian imported steel product. All variables are in logarithms. Robust standard errors are in parentheses.

* Significant at the 5-percent level.

** Significant at the 1-percent level.

tantly, unrestricted estimates based on the non-affirmative sample show no such structural break, as shown by column (5) estimates in Table 4.¹³ The two unrestricted exchange rate coefficients are not statistically different from one another (1-percent level) and are numerically similar to the column (4) estimate of exchange rate pass-through prior to the final determination—findings also consistent with theoretical predictions.

¹³ The partial *F* statistic comparing the restricted column (2) estimates to the unrestricted column (4) estimates is 8.18, greater than the critical value $F(2, \infty)$ of 3.00. This supports the structural break for the affirmative sample. The analogous *F* statistic for column (3) versus column (5) is 0.27, which is less than the critical value $F(1, \infty)$ of 3.84, and therefore does not support a structural break for the nonaffirmative sample.

B. Panel-Specific Autocorrelation and Heteroscedasticity

A potential limitation with estimates in Table 3 involves possible time-series problems such as autocorrelation, a limitation that cannot be addressed with the full sample of 345 products because of missing observations associated with zero trade. We address this limitation by estimating the five specifications in Table 3 with generalized least squares for those 98 iron and steel products that have complete time series, and present these results in Tables 4 and 5. To construct an appropriate benchmark, Table 4 repeats the Table 3 WLS, but for the sample of 98 products. These Table 4 WLS estimates support the major findings of Table 3. Table 4 estimates of the AD duty coefficient in columns (1), (2), and (3) are very similar to one another (ranging

TABLE 5—PASS-THROUGH ESTIMATES FOR U.S.-IMPORTED CANADIAN IRON AND STEEL PRODUCTS, 1989–1995, USING WEIGHTED GENERALIZED LEAST SQUARES AND FIXED EFFECTS: SAMPLE OF 98 PRODUCTS WITH COMPLETE TIME SERIES

Regressor	Full sample (1)	Affirmative sample (2)	Nonaffirmative sample (3)	Affirmative sample (4)	Nonaffirmative sample (5)
U.S. dollar price of Canadian dollar	0.080* (0.033)	0.109 (0.152)	0.109** (0.033)		
U.S. dollar price of Canadian dollar \times period <i>before</i> final determination				-0.111 (0.161)	0.183** (0.039)
U.S. dollar price of Canadian dollar \times period <i>after</i> final determination				0.550** (0.190)	0.121** (0.033)
1 + AD duty	0.872** (0.027)	0.909** (0.063)	0.976** (0.067)		
(1 + AD duty) \times period <i>during</i> investigation				0.797** (0.058)	1.036** (0.069)
(1 + AD duty) \times period <i>after</i> final determination				1.503** (0.157)	
1 + tariff	2.743** (0.262)	3.055** (0.778)	2.448** (0.282)	2.229** (0.748)	2.668** (0.284)
Canadian producer costs	0.278** (0.032)	0.144 (0.103)	0.336** (0.034)	0.300** (0.101)	0.320** (0.035)
U.S. domestic substitute price	0.450** (0.053)	0.585* (0.246)	0.378** (0.054)	0.386 (0.237)	0.357** (0.053)
U.S. expenditures on steel	0.007 (0.020)	-0.091 (0.073)	0.034* (0.020)	-0.098 (0.079)	0.021 (0.020)
Canadian expenditures on steel	0.050** (0.010)	0.076 (0.040)	0.049** (0.010)	0.126** (0.043)	0.056** (0.010)
Wald X^2 statistic:	1,339,650**	3,788.58**	1,437,391**	4,963.40**	1,456,510**
Sample size:	8,232	1,008	7,224	1,008	7,224

Notes: The dependent variable is the U.S. price (inclusive of the duties and tariffs) of the Canadian imported steel product. All variables are in logarithms. Robust standard errors are in parentheses.

* Significant at the 5-percent level.

** Significant at the 1-percent level.

between 0.736 and 0.954), as are the estimates of the exchange rate coefficient (ranging between 0.273 and 0.314), yet, analogous to Table 3, the aggregation bias in both these AD duty and exchange rate pass-through coefficients are revealed by the estimates in columns (4) and (5). In the column (4) estimates for the affirmative products, the AD coefficient approximately doubles at the time of final determination to approximately 160 percent pass-through and the exchange rate coefficient increases from zero to significantly positive (0.769), while the column (5) estimate for the nonaffirmative products indicates no substantial change in the exchange rate coefficient.¹⁴

Estimates in Table 5 repeat the benchmark estimates from Table 4 after GLS correction for panel-specific autocorrelation and heteroscedasticity. The Table 5 GLS estimates support the major findings of both Tables 3 and 4. The AD coefficients in columns (1), (2), and (3) are very similar to one another, as are the exchange rate coefficients. However, for the column (4) estimates for the affirmative products, the AD co-

statistic for structural break for the nonaffirmative products is 8.45. Both support a structural break, but we note that for the nonaffirmative products the magnitude of the change in the exchange rate coefficient is small and in the opposite direction to the corresponding change in the affirmative products. Similar "structural break" tests yield qualitatively identical results for all other estimates presented subsequently in the paper. Details are available from the authors upon request.

¹⁴ In Table 4, the partial F statistic for structural break for the affirmative products is 16.47, while the partial F

efficient approximately doubles to 1.6 at the time of the final determination and the exchange rate coefficient increases from zero to significantly positive; while for the column (5) estimates for the nonaffirmative products, there is no substantial change in the exchange rate coefficient.

C. Dynamic Considerations

Tables 3, 4, and 5 ignore potential dynamic effects in our model. In particular, one may expect that, given monthly data, lagged values of the exchange rate may have an impact on the firms' pricing decisions, perhaps proxying for exchange rate expectations.¹⁵ If true, omission of lagged exchange rates suggests that our pass-through estimates above are biased downward.

To examine this, we created a one-half year moving average series of the logarithm of the exchange rate (contemporaneous plus the previous six monthly observations), and used this in place of the contemporaneous exchange rate specified above (estimates are omitted for brevity). These exchange rate pass-through elasticities increase substantially for the affirmative products relative to the static ones in Tables 3, 4, and 5, as one would expect, while curiously there is little change in the magnitudes of these elasticities for the nonaffirmative products. Importantly, the moving-average estimates support a statistical break in exchange rate pass-through for the affirmative products, but little change for the nonaffirmative products, as with estimates specifying monthly exchange rate variables. In addition, there is little qualitative (and in many cases, quantitative) change in the other coefficients. In particular, pass-through of AD duties is almost identical to the static specification, and most coefficients on other variables are almost identical to previous estimates.¹⁶

¹⁵ Feenstra (1989) finds significant lagged effects in exchange rate pass-through, with the lagged response distributed over one year.

¹⁶ These results are robust to other lag lengths in our moving-average exchange rate variable, and to specifications that include the contemporaneous exchange rate and lagged exchange rates as separate regressors and that replace the lagged exchange rates with a lagged dependent variable. Finally, as detailed in Blonigen and Haynes

D. Testing for Asymmetric Exchange Rate Pass-Through Effects

Since dumping margins were reduced to almost zero during the first administrative review for the cases we examine (as shown in Table 1), it is possible that the involved firms rapidly set prices to exactly eliminate the dumping margin once the AD duties were imposed. As derived in Blonigen and Haynes (1999), this corner solution could lead to asymmetric exchange rate effects.¹⁷ To test for asymmetric effects after AD duties are imposed, we interact the exchange rate variable with dummy variables indicating an appreciation or depreciation of the exchange rate for the period after the duties are imposed. Table 6 presents WLS estimates that allow asymmetric exchange rate effects after the AD duties are imposed for affirmative and nonaffirmative products for both our sample of 345 products [columns (1) and (2)] and the sample of 98 products [columns (3) through (6)], where the final two columns also use GLS methods to address panel specific autocorrelation and heteroscedasticity. We show estimates for the nonaffirmative products as a comparison group, since our theory does not suggest asymmetric effects for these products.

Across these various samples and specifications, there is little evidence in Table 6 for asymmetric effects. *F* tests of equality between the coefficients on an appreciating exchange rate versus a depreciating exchange rate after the investigation cannot be rejected even at the 10-percent significance level, with the exception of the GLS estimates for the nonaffirmative products in column (6). While we can reject equality of the two coefficients for the GLS nonaffirmative sample at the 5-percent level, the magnitude of the difference is quite small.¹⁸

(1999), investigation of stationarity issues suggests our specification with data in levels is appropriate.

¹⁷ Evidence of asymmetry could also be consistent with a dynamic model of partial price adjustment and knowledge of future exchange rate movements.

¹⁸ A possible reason we find little evidence of asymmetry is because of the modest variation in the exchange rate in our sample.

TABLE 6—PASS-THROUGH ESTIMATES FOR U.S.-IMPORTED CANADIAN IRON AND STEEL PRODUCTS, 1989–1995, USING WEIGHTED LEAST SQUARES AND FIXED EFFECTS: EXAMINATION FOR ASYMMETRIC EXCHANGE RATE PASS-THROUGH EFFECTS

Regressor	Sample of 345 products, weighted OLS		Sample of 98 products, weighted OLS		Sample of 98 products, weighted GLS	
	Affirmative (1)	Nonaffirmative (2)	Affirmative (3)	Nonaffirmative (4)	Affirmative (5)	Nonaffirmative (6)
U.S. dollar price of Canadian dollar \times period <i>before</i> final determination	0.241 (0.338)	0.405** (0.079)	0.110 (0.357)	0.473** (0.086)	-0.109 (0.161)	0.177** (0.039)
U.S. dollar price of Canadian dollar \times period <i>after</i> final determination \times exchange rate <i>decreases</i>	0.886** (0.320)	0.382** (0.080)	0.764* (0.302)	0.345** (0.089)	0.569** (0.191)	0.121** (0.033)
U.S. dollar price of Canadian dollar \times period <i>after</i> final determination \times exchange rate <i>increases</i>	0.853** (0.316)	0.387** (0.080)	0.790** (0.299)	0.351** (0.089)	0.609** (0.194)	0.106** (0.033)
(1 + AD duty) \times period <i>during</i> investigation	0.872** (0.070)	1.053** (0.085)	0.855** (0.075)	1.090** (0.094)	0.799** (0.058)	1.033** (0.069)
(1 + AD duty) \times period <i>after</i> final determination	1.631** (0.185)		1.589** (0.111)		1.535** (0.159)	
1 + tariff	1.478 (0.808)	1.178* (0.468)	1.817* (0.771)	0.670 (0.473)	2.057** (0.757)	2.735** (0.285)
Canadian producer costs	0.377 (0.228)	0.273** (0.058)	0.169 (0.263)	0.229** (0.061)	0.305** (0.102)	0.311** (0.035)
U.S. domestic substitute price	0.274 (0.372)	0.584** (0.104)	0.598 (0.437)	0.317** (0.116)	0.441 (0.240)	0.355** (0.053)
U.S. expenditures on steel	-0.073 (0.110)	-0.173* (0.073)	-0.010 (0.122)	-0.160 (0.083)	-0.113 (0.080)	0.029 (0.021)
Canadian expenditures on steel	0.158** (0.056)	0.240** (0.037)	0.163** (0.060)	0.259** (0.042)	0.128** (0.043)	0.056** (0.010)
R^2 :	0.82	0.99	0.83	0.99		
F test (Wald X^2 statistic for GLS):	45.61**	58.96**	67.19**	51.00**	4,962**	1,452,009**
Sample size:	2,608	14,829	1,008	7,224	1,008	7,224

Notes: The dependent variable is the U.S. price (inclusive of the duties and tariffs) of the Canadian imported steel product. All variables are in logarithms. Robust standard errors are in parentheses.

* Significant at 5-percent level.

** Significant at 1-percent level.

E. Threat Effects

Several papers have found evidence suggesting that the threat of AD actions, including filings of AD petitions and preliminary AD determinations, can have effects that rival those observed when firms and products face actual AD duties.¹⁹ The absence of a structural break with our nonaffirmative estimates above suggests no threat effects. However, threat effects

could arise in two additional forms, which we explore in this section.

First, our nonaffirmative products include products that were not investigated as well as investigated products that received negative determinations. Both types of products ultimately face no AD duty, but firms might perceive the future likelihood of an AD investigation and affirmative decision for these two types of products differently and thus alter exchange rate pass-through accordingly. Our pooling of these two types of products may hide differences in exchange rate pass-through. The first two columns of Table 7 repeat for convenience our GLS

¹⁹ See, for example, Staiger and Wolak (1994), Krupp and Pollard (1996), and Blonigen and Feenstra (1997).

TABLE 7—PASS-THROUGH ESTIMATES FOR U.S.-IMPORTED CANADIAN IRON AND STEEL PRODUCTS, 1989–1995.
USING WEIGHTED GENERALIZED LEAST SQUARES AND FIXED EFFECTS—ESTIMATES OF THREAT EFFECTS

Regressor	Sample of 98 products, weighted GLS					
	Affirmative (1)	Nonaffirmative (2)	Negative (2a)	Noninvestigated (2b)	Affirmative (3)	Nonaffirmative (4)
U.S. dollar price of Canadian dollar \times period <i>before</i> AD determination	-0.111 (0.161)	0.183** (0.039)	0.028 (0.088)	0.130** (0.045)	0.013 (0.102)	0.105** (0.027)
U.S. dollar price of Canadian dollar \times period <i>during</i> investigation					0.030 (0.076)	0.070** (0.019)
U.S. dollar price of Canadian dollar \times period <i>after</i> final determination	0.550** (0.190)	0.121** (0.033)	-0.095 (0.079)	0.075* (0.037)	0.690** (0.147)	0.025 (0.018)
(1 + AD duty) \times period <i>during</i> investigation	0.797** (0.058)	1.036** (0.069)	1.292** (0.074)	1.043** (0.094)	0.830** (0.067)	0.961** (0.069)
(1 + AD duty) \times period <i>after</i> final determination	1.503** (0.157)				1.560** (0.156)	
1 + tariff	2.229* (1.117)	2.668** (0.284)	5.019** (0.496)	2.274* (0.437)	1.942** (0.647)	3.256** (0.268)
Canadian producer costs	0.300** (0.101)	0.320** (0.035)	0.531 (0.052)	0.115* (0.045)	0.274** (0.104)	0.299** (0.035)
U.S. domestic substitute price	0.386 (0.237)	0.357** (0.053)	0.221 (0.116)	0.559** (0.062)	0.359 (0.237)	0.360** (0.053)
U.S. expenditures on steel	-0.098 (0.079)	0.021 (0.020)	0.039 (0.039)	0.017 (0.025)	-0.081 (0.080)	0.005 (0.020)
Canadian expenditures on steel	0.126* (0.010)	0.056** (0.010)	0.133** (0.021)	0.033** (0.013)	0.138** (0.042)	0.053** (0.011)
Wald X^2 statistic:	4,963**	1,456.510**	6,473**	1,415,701**	5,493**	1,589,994**
Sample size:	1,008	7,224	2,604	4,620	1,008	7,224

Notes: The dependent variable is the U.S. price (inclusive of the duties and tariffs) of the Canadian imported steel product. All variables are in logarithms. For columns (1) through (4), the first row is the exchange rate coefficient for the period before the *final* determination, whereas for columns (5) and (6) it is the coefficient before the *preliminary* determination. Robust standard errors are in parentheses.

* Significant at the 5-percent level.

** Significant at the 1-percent level.

estimates for the affirmative and nonaffirmative 98 products with complete time series, which were reported in columns (4) and (5) in Table 5. For comparison, columns (2a) and (2b) of Table 7, respectively, disaggregate our nonaffirmative estimates from column (2) into investigated-negative products and noninvestigated products. The exchange rate pass-through elasticities for the two categories of nonaffirmative products are extremely similar and remain unaffected by the final AD determination, which does not support threat effects based on this test.

A second method to detect threat effects is by potential changes in exchange rate pass-through when the products first received *preliminary* AD duties, rather than final duties. In the Canadian iron and steel AD cases, preliminary duties

began in February of 1993, approximately six months before the final determination. Since the first administrative review by the USDOC included this period for their calculations of the revised dumping margins, the firms may have changed their exchange rate pass-through during this period before the final determination, particularly if they anticipated affirmative decisions. As an empirical test, we break the exchange rate pass-through elasticity estimates into three periods rather than two: (1) before the preliminary determinations in February of 1993; (2) during the period between the preliminary and final determinations; and (3) after the final determination. Columns (3) and (4) of Table 7 report GLS estimates for affirmative and nonaffirmative products for this new specification,

where the first row is exchange rate pass-through before the *preliminary* determination (as opposed to the final determination). Here again we find no evidence of threat effects. For both sets of products, we find no difference between the exchange rate pass-through elasticity in the "before" or "during" period, but statistically significant differences for the affirmative products between the "after" period and *both* the "before" and "during" periods.

In summary, the tests we present do not find evidence of threat effects. This does not necessarily rule out the possibility of underlying threat effects that we cannot identify. In particular, the steel industry has a history of AD and other trade actions that span time periods well before our detailed data sample begins, which may influence the parameter estimates for all our products in the sample.²⁰

VI. Conclusion

Antidumping protection has become one of the more important trade policies in the past 20 years, and the new wave of countries adopting antidumping laws suggests even greater activity in the future. This paper examines for the first time the effects of AD investigations on the pass-through of AD duties and exchange rates. We first show that the procedures used to calculate dumping margins and the ability of firms to receive revised AD duties in administrative reviews imply up to 200 percent pass-through of the AD duty to prices in the export market. We then argue that, because these administrative review and dumping margin calculations make future AD duties endogenous with firms' pricing decisions, imposition of an AD duty may

lead to structural breaks in exchange rate pass-through.

We test these hypotheses using a sample of monthly data on U.S.-imported Canadian iron and steel products, some of which were involved in a prominent 1992–1993 U.S. AD case. Our estimates find AD duty pass-through to the export-market price to be around 160 percent, much more than complete, consistent with our hypothesis. With respect to exchange rate pass-through, our empirical results support the prediction that exchange rate pass-through is substantially altered, as we find it increased dramatically after products received final AD duties. We find no similar structural break for nonaffirmative products, regardless of whether they were investigated and received a negative determination or were never investigated. Further analysis finds no evidence of asymmetric exchange rate pass-through after the case, nor evidence of threat effects over the time period of our sample.

Thus, consistent with previous literature, our results provide further evidence that the institutional structure surrounding AD investigations and duties can have many important, and often subtle, implications that transcend the simple ad valorem AD duties we observe. While we show that AD duties and the institutions connected with them can lead to more than complete pass-through of the AD duty and a structural break in exchange rate pass-through in theory, the estimated 160 percent pass-through of the AD duty and *increase* in exchange rate pass-through result from the specific sample we examine. Thus, it would be useful to examine the effect of AD investigations on the pass-through of AD duties and exchange rates with firms from other countries and across other products. A promising sample for this extension might be Japan, since Japan is also one of the largest exporters of iron and steel to the United States and faced significant AD duties from the 1992–1993 cases, but unlike Canada, did not have the duties reviewed until a number of years after the final determination.

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²⁰ A related concern that may affect our estimates more generally are sample selection issues. First, these products may have been investigated and received AD duties because of the associated firms' exchange rate pass-through behavior. However, our sample of nonaffirmative products includes noninvestigated ones that were not part of the 1992–1993 cases, nor any other previous AD cases. In our sample, these products do not exhibit different exchange rate pass-through behavior before the AD case from that of the affirmative products or investigated products that did not receive duties. A second source of sample selection bias may result from our focus on U.S. imported iron and steel products, rather than behavior of affirmative products from all U.S. AD cases.

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