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The Anatomy of Trade Deflection

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Abstract

This study employs four dimensional (firm-product-destination-year) export data of Brazilian firms to empirically examine the effect of past exporting relationships of firms, whose products are targeted by antidumping duties, on their export flows to alternative markets. We show that, on the intensive margin, firms increase their export volumes to alternative countries in which they were already exporting the duty imposed product when they suffer an AD duty in a particular country. On the extensive margin, our findings suggest that firms' probability of exporting a duty imposed product to a new market resulting from an AD duty in a different market increases only if they have already an established trading relationship in that market. In addition to making sense of existing puzzles in trade deflection, this paper makes an important contribution by demonstrating how much the fixed costs of developing an export destination matter in terms of trade deflection.

JEL Classification: F10, F13, O54, C23

Keywords: Antidumping, trade deflection, WTO, intensive margin, extensive margin, firm-level export data

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1. INTRODUCTION

Antidumping (AD) has become a favorite remedy for the firms which seek protection. These preferences have increased especially after the substantial tariff liberalization countries have undergone after the World Trade Organization (WTO)'s rules and enforcements. Most tariffs are governed by trade agreements; however countries can impose temporary import restrictions by the use of alternative instruments. Among these instruments, AD has become the most frequently used and the most effective one.[3]

Similar to other discriminatory adjustments in trade policy, AD duties not only affect the trade flows of the named and the duty imposing country but also affect the trade flows of the third party countries.[4] This effect can occur in the form of trade diversion, a change in the source of origin for a country's imports caused by a change in importer's trade policy, or in the form of trade deflection, a change in the destination of exports due to an increase in trade restriction in a particular export market. One of the more well-known pieces of evidence on trade diversion is from Prusa (2001) who shows that US imposition of an AD duty increases the imports from the countries which are not named in the investigation.

The idea of trade deflection was first introduced by Bown and Crowley (henceforth BC) (2007). In their product-level analysis, they show that US imposition of import restrictions in the form of an AD duty resulted in Japanese exports surging to non-US countries. Their findings suggest that exporters which suffer discriminatory trade restrictions in a country strive to find alternative markets to sell their products. In contrast to their analysis based on Japan, BC

[3] Antidumping duties, which are defined in GATT Article VI, are easier to use compared to other safeguards such as emergency protection of a threatened industry (GATT Article XIX), exceptions for health or safety concerns (GATT Article XX) and restrictions for national security (GATT Article XXI).

[4] A 'discriminatory' trade policy is the one in which a country imposes different trade restrictions to imports from different exporting countries. Two examples in this category are the preferential trade agreements and antidumping duties. On the contrary, a 'nondiscriminatory' trade policy is the one that is applied equally to all importers.

(2010) suggest no systematic evidence of trade deflection for Chinese products targeted by US AD duties. They also mention that the lack of trade deflection could be related to the fact that China is a "new" entrant to the global trading system and Chinese firms have not yet set up necessary networks to deflect trade to alternate markets.[5]

However plausible their argument on the lack of trade deflection in China is, the product-level feature of their dataset does not allow them to explore the linkage between firms' previous exporting status in different markets and trade deflection. It is highly likely that Japanese firms which were serving more markets compared to their Chinese counterparts could deflect their trade to alternative destinations. In addition, some Chinese firms might have deflected their shipments to some of their trading partners, which would be hidden when the exports are aggregated to product level. In the presence of sunk start-up costs of exporting, it is difficult for the exporters to sell their products in alternative markets if they have not setup ongoing trading relationships in multiple markets. This argument is impossible to analyze without breaking down the firm exports by exported products and export destinations.

This study employs a unique four dimensional (firm-product-destination-year) Brazilian firm-level export data to investigate the effect of sunk start-up costs of exporting on the trade flows of the firms to alternative markets when they suffer AD duties in a particular destination. Analyzing the firm-level responses of AD duties on trade deflection will provide a better understanding of which destinations are potential export markets and whether the past trading relationships matter to deflect trade for the firms whose products are targeted by AD measures. In this regard, our rich dataset provides a unique opportunity to explore the variation in exports within firms across different destinations when

[5] China was granted membership in the WTO in 2001 and BC (2010) investigates the pre-accession period of China to WTO.

there is a change in trade barrier for a particular product in a particular export destination.

To date, there is too few studies in the AD literature using firm-level data. Konings and Vandenbussche (henceforth KV) (2008) estimate the effect of antidumping protection on the productivity of domestic import-competing firms in the EU. Belderbos (1997) illustrates the relationship between EU and US antidumping measures and foreign direct investment through a micro-econometrical analysis of Japanese firms' plant establishments in the electronics industry. In a noticeably detailed analysis, Pierce (2011) investigates the plant-level responses to AD measures for the protected plants in the US. Avsar (2012) examines the pricing effect of AD duties and the exporters' response to a threat of retaliation stemming from domestic AD actions. KV (2010) remains the only firm-level study of AD policy to analyze the value of export sales and the extensive margin of exports.

Although related, our paper conceptually distinguishes from KV (2010) by the fact that their study focuses on the effect of France's AD duties on the exports of the domestic protected firms, whereas this paper analyzes the effect of AD duties which targets the exporters in the international market. In addition, they exploit a three dimensional panel which does not differentiate the product categories for the firms which exports multiple products. Whereas, with a four dimensional panel data for firm, product and destinations, the empirical analysis carried out in this paper is a significant improvement over the previous studies which investigate the trading effects of AD measures.

It should be highlighted that AD duties provide a useful way of examining trade deflection. Antidumping duties yield substantial changes in trade flows given the fact that they are on average 10 to 20 times higher than the most favored

nation (MFN) tariffs.[6] Besides, AD duty is a product and a market specific trading cost for a firm. For example, if Mexican AD agencies impose an AD duty on Brazilian cotton shirt exporters, neither the other textile shirt exporters of Brazil nor the cotton shirt exporters of Argentina will be affected by this discriminatory policy adjustment. Hence, if a firm sells multiple products to a destination, it is obliged to pay AD duties only for the particular product which is targeted by the importer country. Since our analysis is based on the attractive source of variation in the value of exports within firm-product combinations across export destinations, these product specific shocks for the firms in different export markets perfectly fits with our research question.

Alongside this, Brazil is a well-suited country for such an analysis for number of reasons. First, highly disaggregated firm-level data of Brazilian exports makes Brazil an outstanding case for this research. Second, Brazilian exported products were frequently targeted by AD duty over the period of our sample. There are 51 AD cases filed against Brazil in this period, 40 of which resulted 'n rulings against Brazil. Moreover, these affirmative cases correspond to 120 unique six-digit HS products. Finally, countries which imposed AD duty on Brazilian exported products accounts for almost 50% of the Brazil's total exports over the sample. This allows us to expect a dramatic impact of AD duties imposed by these countries on the trade flows of Brazilian firms to third countries. Table 1 documents the products subject to AD duties and the duty imposing countries between 1994 and 2000.

Our main findings can be summarized as follows: firms only deflect exports to countries where they have an already established trading relationship. In particular, we find that, on the intensive margin, firms increase their export to alternative countries in which they were already exporting the targeted product when they suffer an AD duty in a particular export destination. On the extensive

[6] See Prusa (2001).

margin, our findings suggest that firms' probability of exporting the duty imposed product to a different market increases only if they have already an established trading relationship in that market. In contrast, we find no significant effect of AD duties on the firms' probability of exporting the particular product in different export destinations that the firm did not serve before.

The remainder of the paper is organized as follows. The next section describes the data; section 3 discusses the motivation of our empirical strategy and the formal econometric methodology. In section 4, we document the results. Finally, section 5 concludes.

2. DATA

Export data comes from the Brazilian customs office *SECEX* (*Secretaria de Comércio Exterior*) which documents exports by product code at the plant, month and *NCM* (*Nomenclatura Comum do Mercosul*) level. The *NCM* codes are 8-digit numbers, of which the first six digits coincide with the first six digits in the Harmonized System. The destination information is mapped from Brazilian country codes into the international ISO system. The product codes at the 6-digit level in the Brazilian data, for which there exists no corresponding Harmonized System entries, are removed from the data. All export values in the SECEX data are reported in current U.S. dollars (USD), free on board (fob). We utilize observations for the years between 1994 and 2000.[7] We aggregate monthly plant-level export information to years and firms. Export sales are deflated to their August-1994 equivalents using the monthly U.S. consumer price index (from Global Financial Data).

The employment and wage data of Brazilian firms are obtained from the collection of annual reports with individual information on workers and employees, which is called RAIS (*Relacao Anual de Informacoes Sociais).* Similar to

[7] The data is not available after 2000.

our treatment of the export data, we aggregate the monthly worker-plant information to years and firms.[8]

Finally, the data on AD is obtained from *Global Antidumping Database*.[9] This database provides detailed product level information on the AD petitions such as the initiation date, the decision date, the targeted country, and the final decision of the AD authority as well as the HS codes of the products subject to filings.

3. THE EMPIRICAL INVESTIGATION

The Classification of firm-product combinations

Participating in export markets requires sunk start-up costs in the form of establishing necessary networks, acquiring information about the official procedures and adapting products. This makes the current-period export supply dependent upon the previous exporting status, given the fact that firms are able to continue exporting without burdening the start-up costs if they already exported to a particular market before.[10] Das et al. (2001), for instance, provide an estimation of such costs using structural estimates for Colombian firms and suggest that these costs are quite substantial; on average as high as 400,000 dollars. Most models of international trade on firm heterogeneity assume that these entry costs to export market are constant and exogenous to the firm.[11] More recently, utilizing Chilean firm-level data Alvarez et al. (2010) uncovers sizeable heterogeneity across destinations in the nature of entry into different markets for firm-product combinations. Their study points out that these costs are indeed, market and product-market specific.

We also build our empirical strategy on these start-up costs of exporting. Before proceeding, we demonstrate the basis of our classification in Figure 1. Suppose that country *i* impose an AD duty on Brazilian exporters of product X.

[8] See Hirakawa, Muendler and Rauch (2010) for more information about SECEX and RAIS data.
[9] http://econ.worldbank.org/ttbd/gad/
[10] See Dixit (1989) and, Baldwin and Krugman (1989), Bernard and Jensen (2001).
[11] For example, Clerides et al. (1998) and Melitz (2003).

There are three types of firms at the time of duty imposition which are affected by this AD measure:

- *Type 1 firms*, which were exporting product X to country *i* and non-exporter in country *h*.
- *Type 2 firms*, which were exporting product X to country *i* but exporting another product to country *h*.
- *Type 3 firms,* which were exporting product X both to *i* and *h*.

In order to deflect its trade to country *h*, *type 1* firm, which did not export to country *h* before, has to incur the market specific start-up costs such as learning the bureaucratic procedures of exporting to country *h* and product-market specific start-up costs such as adapting the particular product in country *h*. However, *type 2* firm does not have to incur the market specific start-up cost in a similar scenario, given the fact that it has already served country *h* before. When it comes to the *type 3* firm, which has an ongoing trading relationship for good X in both countries, there is no need to pay any start-up cost. Intuitively, deflecting trade to its trading partner for the *type 3* firm is as easy as a couple of more phone calls compared to the *type 1* firm which has to undertake the cost of entering to a new country, contacting potential customers and establishing necessary distribution channels to sell its product. On the other hand, *type 2* firm has a comparative advantage over *type 1* firm in terms of market specific start-up costs such as learning the bureaucratic procedures to export to country *h*.

In the light of this three country setting, we first determined the firms which were the target of an AD duty at least once in the sample. Second, we constructed a panel for the firm-product-country triplets where the countries are the top 40 export destinations of Brazil. Third, we created a dummy variable which takes on a value of 1 if there is an AD duty in force targeting the particular firm-product combination in a country other than the country of the unit

observation. [12] Finally, in order to identify the effect of previous trading relationships of the firms, we used three different dummies for the three types of past export status described above.[13] More specifically, each AD duty imposed in an export market creates the three country case mentioned above for Brazil, the duty imposer country and the destination country of the unit observation.

To better understand the construction of the data, a representative case is illustrated in Table 2. In 1996, Mexico imposed AD duty to Brazilian steel connectors' exporters (HS6 Code: 730719). At the time of the duty imposition, a firm was exporting steel connectors to Mexico, Chile and USA and ferro-silico-manganese to Canada and Chile. The AD dummy is unity for steel connectors in non-Mexican destinations to identify the effect of the imposed AD duty by Mexico. As shown, this firm was non-exporter in Argentina, exporter of steel connectors in Chile and exporter of another product in the USA in the previous 3 years. Each firm-product-destination is unity only for one of the past export status dummy which captures the effect of belonging one of these categories on exporting. The interaction of the AD variable and the past export status, on the other hand, captures the effect of the Mexican AD duty for these different categories.

Baseline Estimation

We start our empirical exercise by estimating the following equation:

$$\ln(x_{fpit}) = \gamma_0 + \gamma_1 \ln(x_{fpi,t-1}) + \gamma_2(AD_{pht}) + \gamma_3(W_{ft}) + \varepsilon_{fpit} \qquad (1)$$

where *f* denotes a firm, *p* denotes a six-digit HS product, *i* denotes an export destination, *t* denotes time in years between 1994 and 2000. The variable (x_{fpit})denotes the value of exports, (AD_{fpht}) is a binary indicator, equal to 1 if the particular firm-product combination is hit with an AD duty in an export

[12]Following BC (2007), this variable is not zero in the period in which the investigation for an affirmative AD case is begun because of the fact that the targeted exporters begin to respond to tentative duty imposition shortly after the date filing is announced.

[13] We used three-year definition to denote past exporting status positive.

destination except country i [14]. (W_{ft}) is a vector of firm characteristics. The magnitude of γ_2 can be interpreted as trade deflection resulting from the AD duty in country *h*.

We assume that ε_{fpit} comprises two components, a permanent firm-product-country component and a transitory component. So the error term satisfies:

$$\varepsilon_{fpit} = u_{fpit} + \mu_{fpi} \tag{2}$$

where u_{fpit}~iid$(0, \sigma_U^2)$ and μ_{fpi}~iid$(0, \sigma_\mu^2)$ are independent of each other. Fixed effects (FE) estimator is one way of estimating equation (1) because it eliminates time invariant error component, μ_{fpi}. However, the greatest econometric concern in FE estimation of equation (1) is that it results in biased and inconsistent estimates associated with the serial correlation of $\ln(x_{fpit-1})$ with FE transformed residuals. In order to remedy this autocorrelation, we first difference equation (1) and estimate it using the two stage least squares/instrumental variables (IV) approach described in Anderson and Hsiao (1982) in which we instrument for using the multiple lags of the levels of this variable.[15,16]

It should be emphasized that there are also two potential problems with the IV estimator used in estimating equation (2); bias due to the measurement error and bias associated with the use of a weak instrument. If there is measurement error in $\ln(x_{fpit})$, then the measurement error in the variable, $\Delta\ln(x_{fpit-1})$, will be correlated with the measurement error in the instrument, $\ln(x_{fpit-2})$. Therefore, we employ an alternative instrument, $\ln(x_{fpit-3})$, in consideration that its measurement error is not correlated with the measurement error in $\Delta\ln(x_{fpit-1})$.[17]

[14] This variable is non-zero for the consecutive years in which the duty is in effect.
[15] Note that direct estimation of the first difference of equation (1) by OLS also provides biased estimates because lagged difference of exports is correlated with the error term.
[16] Inclusion of the lagged dependent variable is important to control for the consideration that firms may ramp up exporting everywhere regardless of the AD action.
[17] See BC (2007) for the same argument.

In addition, to test the quality of the instrument, we estimate the first-stage model using our instrument. We find that our instruments are strong and conclude that IV approach is appropriate for our estimation.[18]

Control Variables

Exporters are found to be more productive than non-exporters.[19] In line with this, a change in exporter firm's productivity over time might affect the total value of its shipments. Therefore, our policy interactions might capture the effect of a productivity shock at the firm level that would be correlated with the growth in exports. The customs data does not allow us to control for productivity because it contains no information on domestic sales. However, we control for the size of the firms which is measured by the total number of workers employed within a year. It is believed that larger firms tend to be more productive and have higher expected profits from exporting. Moreover, as discussed in Bernard and Jensen (2004), size may control for several factors; larger firms have lower average and marginal costs which improve exporting activity and also size is a proxy for past success by definition.

The growth in exports can also partially be explained by macroeconomic factors in the destination market. For instance, trade openness, GDP growth and exchange rate appreciation in a potential export market can work as an import demand shifter which would help exporters deflect their shipments to that destination. In this regard, we use country-year dummies to control for macroeconomic aggregates.

Introducing the role of previous exporting relationships

The first column in Table 2 documents the estimates for equation (1). Although the policy variable,(AD_{fpht}), has the expected sign, it is not statistically

[18] While we do not report the results of the instrument tests, the first stage estimations are available from the author upon request.
[19] See Greenway and Kneller (2007) for a survey of this literature.

significant. In order to examine whether the previous trading relationships of the firms for the targeted products provides a different outcome in terms of trade deflection, we continue with estimating the following equations:

$$\ln(x_{fpit}) = \theta_0 + \theta_1 \ln(x_{fpi,t-1}) + \theta_2(AD_{pht}) + \theta_3 T_3 + \theta_4(AD_{pht}).T_3 + \theta_5(W_{ft}) + \varepsilon_{fpit} \quad (3)$$

$$\mathrm{P(EXP)}_{fpit} = \alpha_0 + \alpha_1 \ln(x_{fpit-1}) + \alpha_2(AD_{pht}) + \alpha_3 T_1 + \alpha_4 T_2 + \alpha_5(AD_{pht} * T_1) + \alpha_6(AD_{pht} * T_2) + \alpha_7(W_{ft}) + \varepsilon_{fpit} \quad (4)$$

where T_3 is a dummy and unity if the firm in the unit observation was exporting the targeted product to both country *i* and *h* before the duty imposition.

The equation (4) models the probability of exporting in an export market when an AD duty imposed in a different market (extensive margin). $(\mathrm{EXP})_{fpit}$ is a binary variable that equals 1 if the firm exports product *p* to country *i* in time *t* and zero otherwise. T_1 takes on a value of 1 if the firm was non-exporter in country *i* and T_2 is equal to 1 if the firm did not export product *p* but exported another product to country *i* before the duty imposition.

The most important issue in estimation (4) is the influence of unobserved heterogeneity. There might be some permanent firm or product attributes; or managerial skills which are correlated with the decision to start exporting a particular product as a result of an AD duty imposed in another destination. This will yield us to overestimate the effect of our policy interactions as these variations are not observed. There are different alternatives to estimate the binary choice model of starting to export a product with unobserved elements including maximum likelihood techniques such as probit or conditional logit, or linear probability model with random or fixed effects. For the reason that unobserved heterogeneity is correlated with our firm specific controls, random effect estimation is not appropriate for our specification. As a result, to model the unobserved heterogeneity as fixed, we choose to work with linear probability model.

In addition, it is highly likely that unobserved characteristics in our model are serially correlated with $\ln(x_{fpit-1})$. Therefore, we follow a methodology similar to our earlier estimation to correct for autocorrelation and instrument for $\ln(x_{fpit-1})$ using its second lag. Given the potential correlation of FE transformed residuals with the lagged export value, we also estimate our model using IV first differences in order to avoid the problem of inconsistent estimates found in the fixed effects model.

4. RESULTS

The results derived from estimating equation (3) are shown in the second column of Table 2. As opposed to the first specification, the effect of AD duty is significant when it is interacted with the past exporting status (*type 3*). This suggests that firms begin to increase their shipments to alternative countries that they were already exporting the same product when they suffer an AD duty in a particular export destination (intensive margin). In terms of the economic interpretation, imposition of a trade restriction in the form of an AD duty on a six-digit HS product results in a 13% increase in the Brazilian firms' exports of the targeted product to alternative countries where the firms previously exported the same product.[20]

The third column of Table 2 documents the results for the extensive margin estimation. Similarly, the past exporting statuses of the firms are interacted with the policy variable. As shown, although the interaction of AD duty variable is significant for *type 2*, the policy variable itself and the *type 1* interaction term is insignificant. This suggests that imposition of an AD duty in a particular destination increases the firms' probability of exporting the targeted product in a different destination if the firm already served the market before. On the contrary, we do not observe such a probability increase to the export destinations that firms

[20] To better quantify the magnitude of trade deflection, we use the formula in Kennedy (1981) to convert the coefficient of the dummy variable to its true marginal effect.

did not export before. In terms of the magnitude of the effect, imposition of an AD duty in a particular destination increases the probability of exporting in a different destination by 11 for the destinations that the firm exported another product before.

In conclusion to the extensive margin estimation, the insignificant coefficient of *type 1* interaction demonstrate that market specific start-up costs of exporting plays a crucial role in determining the potential export market to deflect trade for the firms whose product suffer an AD duty in a particular destination. This might also be related to the temporary feature of the AD duties. It would be plausible for a targeted firm to deflect its trade to a country they never exported before as a result of a permanent change in a particular country's trade policy. However, the cost of the temporary adjustment in trade policy in the form of an AD duty in an export market does not seem enough to dominate the market specific start-up costs in another destination; although it seems to offset the market-product specific start-up costs.

5. CONCLUSION

Trade deflection has become an important issue in the WTO and other Customs Unions' framework. From China specific safeguards to intra-regional trade protocols, there are many examples of policy debates regarding this issue.[21] This paper represents the first attempt to utilize a rich four dimensional customs data of firms, products and export destinations to analyze the effect of past exporting relationships on trade deflection resulting from AD duties which targets Brazilian exported products. Our key finding is that firms only deflect exports to countries where they have an already established trading relationship. In particular, we find that, on the intensive margin, firms increase their export by to alternative countries in which they were already exporting the targeted product when they suffer an AD duty in a particular export destination. On the extensive

[21] WTO section 16.8 allows a WTO member to impose a "China safeguard" on a product imported from China if the same product has already been targeted by another WTO member.

margin, our findings suggest that firms' probability of exporting the duty imposed product to a different market increases only if they have already an established trading relationship in that market. In contrast, we find no significant effect of AD duties on the firms' probability of exporting the particular product in different export destinations that the firm did not export before. In addition to making sense of existing puzzles in trade deflection, this paper makes an important contribution by demonstrating how much the fixed costs of developing an export destination matter in terms of trade deflection.

Our paper also paves the way for a more detailed exploration of trade deflection using the firm level data in order to better understand the trading effects of AD policy not only for the duty imposer and the targeted country but also for the third party countries which are not named in the investigation. In addition, we also point out a new view to examine the relationship between trade deflection and the spread of worldwide AD filings. We believe that researchers and policy makers should focus more on exporting firms' past trading relationships when evaluating the threat of trade deflection in the World trading system. For instance, Feinberg and Reynolds (2006, 2007) and Moore and Zanardi (2008) speculate that the spread of AD filings may partially be explained by trade deflection.[22] As noted earlier, when exports are deflected to third party countries, these third countries might also subsequently request more import protection in the form of AD duties. To capture this possible explanation, they use a variable which is equal to the number of global AD cases filed the previous year in the particular industry category. Although their estimates are significant, this variable does not capture the true effect of trade deflection due to the aggregation. It is not typical for a country to impose a restriction on a product because of a surge in imports in another product within the same industry. Second, this measure does not provide any clue about the destinations that exports should deflect to. For

[22] We should note that the effect of trade deflection on the spread of AD filings is not the actual research question, whereas, it is a control variable in both papers.

instance, a high number of AD duties imposed on steel products in North America against Mexico does not guarantee either trade deflection for all Mexican firms or trade deflection to all countries. As a matter of fact, it is less likely to observe a reaction from a country, which has a small import share of steel from North America, to a steel war in the region.

Our study also raises concerns to the WTO's China safeguard which allows members to deviate from MFN rule based on the threat of trade deflection. As more disaggregated firm-level data of exports become available, we believe that researchers should focus on the trading relationships of firms in different countries when they evaluate the threat of trade deflection and its effect on the rise of protectionist policies.

Another related question regarding our paper is whether the targeted firms switch exported products in the duty imposer country when they deflect their trade to different destinations or whether the imposition of an AD duty in a country affects the firms' exports of another product, rather than the targeted one, because of trade deflection. While our focus in this paper is the effect of past trading relationships on trade deflection, analyzing the trading effects of AD in terms of these related topics is an attractive avenue for future research.

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TABLE 1: ANTIDUMPING DUTIES IMPOSED ON BRAZILIAN EXPORTERS

1994-2000

Case	Imposing country	Product	Year
1	USA	Stainless Steel Wire Rod	1994
2	USA	Ferrosilicon	1994
3	USA	Silicomanganese	1994
4	USA	Stainless Steel Bar	1994
5	Australia	A4 Cut Ream Copy Paper	1994
6	Australia	Fibreglass Gun Rovings	1994
7	Canada	Corrosion Resistant Steel Sheet	1994
8	European Union	Pig Iron (Hematite)	1994
9	India	Bisphenol-A	1994
10	Mexico	Specialty Steel Products	1994
11	European Union	Ferro-Silico Manganese	1995
12	Mexico	Hot-Rolled Steel	1995
13	Mexico	Steel Sheets	1995
14	Mexico	Cold-Rolled Steel	1995
15	Mexico	Steel Plates In Rolls	1995
16	Mexico	Corrugated Iron Sheets	1995
17	Mexico	Butyl Rubber	1995
18	USA	Pressure Pipe	1995
19	Mexico	Steel Connectors	1996
20	Peru	Calcium Carbide	1997
21	Argentina	Chain Saws	1997
22	Argentina	Ceramic Magnets	1997
23	Argentina	Fuses	1997
24	South Africa	Suspension PVC	1997
25	Argentina	Gas Carafe	1998
26	Argentina	Fiber Optic Cables	1998
27	European Union	Monosodium Glutamate	1998
28	South Africa	Uncoated wood-free paper	1998
29	Argentina	Chains	1999
30	Argentina	Abrasives	1999
31	Argentina	Flat Laminated Products	1999
32	South Africa	Cut paper (A4)	1999
33	Argentina	Eviscerated Chicken	2000
34	Argentina	Javelins	2000
35	Argentina	Denim	2000
36	Argentina	Steel Sheets	2000
37	Canada	Hot-Rolled Carbon Steel Plate	2000
38	Canada	Stainless Steel Round Bar	2000
39	Turkey	Fittings	2000
40	European Union	Malleable Cast Iron Pipe Fittings	2000

Source: Bown (2010)

Table 2. Example of data							
Firm	**Product**	**Destination**	**Year**	**AD dummy**	**Type 1**	**Type 2**	**Type 3**
101	Steel connectors (HS6:730719)	Argentina	1996	**1**	**1**	0	0
101	Steel connectors (HS6:730719	Chile	1996	**1**	0	**1**	0
101	Steel connectors (HS6:730719)	USA	1996	**1**	0	0	**1**
101	Ferro-silico-manganese (HS6:720230)	Canada	1996	0	0	0	1
101	Ferro-silico-manganese (HS6:720230)	Chile	1996	0	0	0	1

Table 3. Estimation Results

	Intensive Margin IV first dif.		*Extensive Margin IV first dif.*
	(1)	*(2)*	*(3)*
AD duty	0.073	0.062	0.014
	(0.26)	(0.86)	(0.63)
*AD duty*type1*			0.054
			(0.77)
*AD duty*type2*			0.113
			(12.38)***
*AD duty*type3*		0.132	
		(8.32)***	
Type1			-0.013
			(1.01)
Type2			0.156
			(1.67)*
Type3		0.192	
		(10.53)***	
$ln(exp_{fpit-1})$	0.154	0.166	
	(19.22)***	(18.43)***	
$ln(emp_{ft})$	0.089	0.082	0.069
	(15.76)***	(22.67)***	(10.14)***
Country-year dummies	Yes	Yes	Yes
R^2	0.17	0.21	0.18
Observations	18657	18657	173040

Notes: Subscript *f* is a firm, *p* is a 6-digit HS product, *i* is an export market, *t* is a year. Absolute values of t statistics are in parentheses. ***, **, * denote variables statistically significant at the 1, 5 and 10% level respectively. All specifications include a constant term which is suppressed.

Table A1. SUMMARY STATISTICS

Variable	Mean	Standard deviation	Observations
$\Delta ln(exp_{fpit})^{\varphi}$	6.534	3.869	18657
EXP_{fpit}	0.312	0.967	173040
$(ADduty)_{fpht}$	0.416	0.553	173040
$(ADduty)_{fpht}$* $Type1$	0.182	0.370	173040
$(ADduty)_{fpht}$ * $Type2$	0.109	0.267	173040
$(ADduty)_{fpht}$ * $Type3$	0.125	0.289	173040
$\Delta ln(employment)_{ft}$	-0.031	0.654	173040

Notes: Global Antidumping Database, SECEX and RAIS. Notes: Subscript f is a firm, p is a 6-digit HS product, i is an export market,t is a year. φ denotes the summary statistics only for the unit observations with positive export values.