The Trade Effects Associated with an Antidumping Epidemic:

The Hot-Rolled Steel Market, 1996-2001

Preliminary Draft*

June 2004

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Abstract

Between 1996 and 2001 the world steel industry filed several hundred antidumping (AD) complaints, almost one hundred of which involved hot-rolled steel alone. Because hot-rolled steel is a relatively homogenous product that nearly all steel firms can produce, trade is highly sensitive to such trade impediments. Moreover, these characteristics make hot-rolled steel an ideal case study for examining whether other potential AD-induced trade effects --trade diversion and trade deflection -- explain why the initial cases on hot-rolled steel were not a typical trade spat, but rather an AD outbreak of historic proportion.

To identify the trade effects we create a detailed database of bilateral trade at the six-digit HS level of hot-rolled steel during the 1996-2001 period involving 142 exporters and 112 importers. On a global basis, we find strong evidence of trade depression, somewhat weaker evidence of trade deflection, and little evidence of trade diversion. These results make it unlikely that the hot-rolled AD epidemic had little to do with the characteristics of AD protection. We also report separate results for the United States alone and find stronger evidence of trade diversion. In the course of the paper, we also discuss various areas where future research can shed light on the trade effects of antidumping measures.

* Prepared for presentation at the University of Nottingham conference on "The 100th Anniversary of Antidumping Regulation," June 25-26, 2004. We would like to thank Ethel Fonseca for helpful research assistance. The views presented are solely those of the authors and do not necessarily represent those of Willkie Farr & Gallagher, LLP or its clients.

I. Introduction

On a number of levels it is particularly apropos that the world's first antidumping (AD) dispute involved Canadian imports of US steel. In hindsight, it strikes us that this case foretold the how AD would be used over the next century. For example, the case involved two developed countries; developed countries in general, and these two countries in particular, have been among the most aggressive users of AD measures. (cites). The plaintiff was a struggling manufacturing industry; most AD cases have involved manufacturing (cites). The respondent was arguably the world's most efficient producer at the time; many AD disputes seemingly are primarily directed toward efficient producers (Kolev and Prusa, 2002). In other words, to a large extent the same broad strokes that characterize the inaugural antidumping dispute also characterize the vast majority of AD disputes over the last 100 years.

But perhaps most significantly, the initial AD case involved steel. Although we have never seen a full century-long accounting, trends over the last 30 plus years make us confident that on a global basis over the past 100 years the steel industry has filed more AD complaints than any other industry.

In recent years some things have changed. For instance, today AD measures are no longer just a trade weapon for a handful of rich, developed countries, but rather are now used by countries of all stages of development from all regions of the world (Miranda, Ruiz, Torres, 1997; Prusa, 2001; Zanardi, 200x). The range of product target has also expanded, and now agricultural products are frequent targets.

On the other hand, many other things remain the same–most notably, the prominence of steel disputes. Over the last decade the steel industry has continued to dominate the AD headlines. In a fitting capstone, the first century of AD measures ended with an unprecedented burst of worldwide steel disputes. During the last half of the 1990s steel accounted for approximately one out of every three antidumping disputes around the world, far outpacing all other industries other than petrochemicals. In other words, at a time when more countries were filing more AD disputes than at any time in history, steel remained one of the unquestioned leaders of the pack.

The AD steel epidemic that occurred in the late-1990s involved nearly every conceivable type of steel product, from pipe and tube to stainless plate and sheet, from steel bar to structural beams, from wire to tinplate. Of all the steel products involved in AD disputes, however, hot-rolled steel was the undisputed champ. By our accounting, between 1997 and 2001 about one-quarter of all steel disputes involved hot-rolled steel.

There are a variety of reasons why hot-rolled steel has been the subject of so many disputes. To begin with, although there are hundreds of types of steel products, arguably the most commercially important types of steel are flat-rolled steel. Hot-rolled steel is a type of flat-rolled steel. Moreover, flat-rolled steel producers have historically been particularly dependent on trade protection as a means to maintain market share. Second, unlike other varieties of flat-rolled steel, hot-rolled steel is one of the few that can be produced by nearly all steel firms. Third, among flat-rolled steel products, hot-rolled steel is possibly the most homogenous. There are certainly specialized hot-rolled steel products, but the vast majority of traded hot-rolled steel is standardized and largely interchangeable. Fourth, because it has so many commercial applications the volume of

trade in hot-rolled steel is larger than other flat-rolled products. Taken together, these attributes mean that hot-rolled steel not only is an easily and widely traded steel product, but also is especially valuable for import-competing firms to restrict.

In Table 1 and 2 we list the AD cases involving hot-rolled steel during the 1997-2001 period. In Table 1 we sort the cases by filing countries and in Table 2 we sort by subject countries. As shown, 13 different countries filed a total of 84 hot-rolled cases against 31 different countries. Six of the 13 filing countries (Argentina, Canada, EU, Peru, USA, and Venezuela) initiated hot-rolled cases in different years. Half of the subject countries were named in more than one case. Interestingly, the countries filing the most cases (Argentina, Brazil, EU, India, and USA) were also all accused of dumping hot-rolled steel.

The trade consequences of this trade epidemic are noteworthy. In terms of trade volume, the filing countries accounted for about one-half of worldwide hot-rolled imports and the subject countries accounted for almost 90% of all hot-rolled exports.[1] Looking at the volume of trade restricted, the cases involved about one-quarter of all hot-rolled trade during this period of time.

Although a full analysis of the reasons for and consequences of the turmoil in the hot-rolled market is beyond the scope of this paper, we believe that the events between 1997 and 2001 in the hot-rolled steel market provide an excellent opportunity to learn about the trade effects of AD protection. Previous studies of AD measures have been limited because they have focused on a single using country (Staiger and Wolak, 1994; Prusa, 1997, 2001) or a single affected country (Bown and Crowley, 2003). The dozens

[1] These statistics drop all intra-EU trade from the totals since an AD case cannot be filed against a fellow EU member.

and dozens of trade complaints involving the same products initiated by many different countries all within a very short time period allows one to develop a more general perspective on the trade effects of AD measures than possible in these previous studies.

First of all, we can quantify the direct impact of AD protection. As all undergraduates learn in their first international economics course, if Country U imposes a tariff (or AD duty) t_J on country J, then imports from J to U should fall. The magnitude of the impact is an open question. Because hot-rolled steel is a relatively homogenous product and because there are so many potential supplies, we expect the trade impact to be quite large. We will refer to this direct impact as trade depression.

Trade depression, however, is not the only possible way AD measures may affect the market. As Staiger and Wolak (1994) and Prusa (1997, 2001) discuss, AD protection can lead to substantial trade diversion. That is, if Country U imposes a tariff t_J on country J we can expect that imports from other countries will increase. Once again, how big the effect is unknown, but in the case of hot-rolled steel we expect substantial trade diversion.

Bown and Crowley (2003) emphasize a third possible impact of AD protection, which they call "trade deflection." By this they mean that the countries subject to an AD investigation by country U may shift their sales to other markets to make up for the lost market in the original importing country.

These latter two effects are especially relevant for understanding the hot-rolled AD epidemic. Specifically, trade diversion and deflection might explain why there seemed to be a complete breakdown in the hot-rolled market. Trade diversion would explain why several countries felt it necessary to file multiple AD cases over the period.

Trade deflection would explain why what might of otherwise been a simple trade dispute turned into a gigantic worldwide trade event. Although neither effect justifies the use of AD measures, finding concrete evidence of these effects would at least help researchers better understand the dynamics of what happened.

To identify these three separate trade effects, we create a detailed database of bilateral trade at the six-digit HS level of hot-rolled steel during the 1996-2001 period involving 142 exporters and 112 importers. On a global basis, we find strong evidence of trade depression. Specifically, we find that an AD action causes trade to fall by almost 90% during the first year following the case. We find somewhat weaker evidence of trade deflection, where subject countries increase their shipments to 3rd countries by about 30% following the AD action. Interestingly, we find little evidence of trade diversion on a global basis. When we restrict our sample to the United States alone and find stronger evidence of trade diversion but little evidence of trade deflection.

Overall, these results lead us to question the conventional wisdom that the AD epidemic in steel emerged directly from the the "side-effects" of AD protection. In particular, any suggestion that AD measures need to be reformed and toughened to address diversion and deflection more aggressively finds little support from our results.

The remainder of our paper is organized as follows. In section 2 we provide a brief description of hot-rolled steel and the hot-rolled steel market. In section 3 we present evidence of the sundry trade effects of AD protection and present our formal estimates. Concluding comments including a discussion of various areas where future research can shed light on the trade effects of antidumping measures are contained in section 4.

II. A Primer on Hot-Rolled Steel and Related Trade Frictions

Hot-rolled steel is a basic steel product. When molten steel has been poured into thick slabs, steel factories continue rolling the steel while it is still "hot" to reduce the thickness. Once the steel has been reduced to thickness of 4.75 mm or less, it is considered "hot-rolled steel." Most frequently, hot-rolled steel is sold in large coils weighing several tons each.

Hot-rolled steel has a number of characteristics that make it very "trade sensitive" and therefore the target of many trade disputes. This product is the first stage in steel production at which a finished product with an active merchant market (arms length sales to unrelated customers) exists. Earlier stages, such as steel slab, are primarily consumed captively by the steel manufacturer to make other products, and are not sold actively in open markets. Hot-rolled steel, in contrast, has an active merchant market. Much of hot-rolled steel production is also captively consumed to make downstream products, such as cold rolled steel (further reduction in thickness using cold rolling) and corrosion resistant steel (cold rolled steel that has been coated in zinc), but there is also an active merchant market. This feature means when hot-rolled steel is sold internationally, it can potentially affect the competitive success of domestic producers of hot-rolled steel in the importing country.

Moreover, because it is a relatively simple steel product, everyone can make hot-rolled steel. If a country can make steel at all, it can make and export hot rolled steel. Quantity considerations can be important, but for the vast bulk of internationally traded

hot-rolled steel, most steel suppliers can produce commercially acceptable steel. It is not surprising, therefore, that the trade statistics show that 142 different countries supplied hot rolled steel to 112 different importing countries. Although some of this trade is probably resale of product purchased from another country that manufactured the hot-rolled steel, the numbers are still quite large by any measure.

Finally, the steel industries around the world have been among the most active users of the antidumping laws. Over the past five years, steel industries have filed about 30-40 percent of all antidumping cases world-wide.[2] Given their extensive experience with the antidumping laws, it is not surprising that the steel industries have frequently filed cases against hot-rolled steel.

In the late 1990s, the world-wide steel industry experienced various difficulties. Most industry observers point to the increase of new steel capacity in many countries at the same time that older uncompetitive capacity was slow to exit the market. Not surprisingly, with too much capacity chasing too little demand, many countries began to increase their exports, and these exports triggered a variety of trade proceedings. This period of economic difficulties lead to a series of antidumping cases and culminated with a series of safeguard cases on steel in the 2001 to 2002 period.

The period 1996 through 2001 thus serves as an ideal case study to study the effect of antidumping cases on trade flows. This time period captures some very intense antidumping activity, as 13 different countries filed 22 different antidumping cases that involved 84 distinct investigations of individual countries. Indeed, over this period the

[2] cite Global Trade Protection Report.

United States filed two cases, the EU filed three cases, Canada filed two cases, and even new user Argentina filed three cases. These four countries were among the top six users of AD measures over the past five years. Over our period, 30 different countries were targeted by antidumping cases.

This surge in antidumping activity on steel had its origin in the former Soviet Union. Always a major steel producer to meet Soviet military needs, the Russian and CIS steel industries faced severe economic difficulties in 1997. The combination of weak domestic demand for steel, and a desperate need for foreign exchanges, led to massive increases in Russian and CIS steel exports in 1997 and 1998. It is no coincidence that 26 out of 84 antidumping cases in our sample involved either Russia, the Ukraine, or Kazakhstan.

Although Russia was the trigger, other countries soon found themselves swept up the frenzy of antidumping cases. With the acceptance of "cumulation" as a legal doctrine in the WTO Antidumping Agreement, most antidumping cases have become multi-country cases. Traditionally, anti-dumping cases targeted individual countries that were the major problem. Importing countries would sometimes investigate multiple export sources, but the domestic industry had to be confident it could prove the requisite injury with regard to each import source. Under the doctrine of cumulation, however, the administering authority can analyze the combined import levels of all countries targeted, and can gloss over the trends for individual countries. Under Article 5.8 of the WTO Antidumping Agreement, a country should be exempt from this rule of cumulation if its imports are less than 3% of all imports, but can be drawn back into the cumulated analysis if the total of all countries less than 3% is more than 7% of the total. This legal

rule has had the perverse effect of forcing domestic industries to include enough small exporters to overcome the 7% test. If a petitioning industry identifies one target, it will therefore look for other targets that can also be swept into the same case.

Given this new legal rule, and the number of suppliers of hot rolled steel, it is not surprising that the hot rolled steel cases were overwhelmingly multi-country cases. Of the 22 different cases filed, the number of target countries ranged from 1 to 13. The average number of target countries was 3.8 per case.

In mid-2001 the US initiated its highly controversial and well-publicized steel safeguard investigation. The safeguard tariffs were imposed beginning in the second quarter 2002. In part because the US action was viewed as inconsistent with WTO obligations and in part because of fear of trade deflection the US tariffs triggered numerous similar cases around the world. As a result, we end the period of our study in 2001. Any analysis of the period between 2002 and 2004 must account of the complexity of multiple safeguard investigations that potentially affected all steel trade into those countries. The earlier period, however, allows us to focus on the effects of antidumping activity alone.

III. Trade Impact of AD Measures

Related Literature

The literature discusses three potential effects of an AD action on trade patterns: trade depression, trade diversion, and trade deflection. By "trade depression" we mean the direct impact of raising the tariff on imports into the subject country. For instance, if

Country U imposes an AD duty t_J on country J; trade depression refers to the impact of the AD duty on imports from J to U (m_{JU}). We expect the impact to be negative -- antidumping duties should decrease trade flows.

By trade diversion we refer to one of the side-effects of the country-specific nature of AD protection. Namely, trade diversion refers to the effect on non-subject country(ies) when another country is subject to an AD investigation. For instance, if Country U imposes an AD duty t_J on country J; trade diversion measures the impact on imports from K to U (m_{KU}). We expect the impact to be positive, which means that the non-subject countries will partially fill the void in the importing country market when country J's export sales to U fall.

By "trade deflection" we refer to another possible side effect of AD protection, but this time the impact involves trade between the subject and non-subject countries, and does not involve the country that began the original antidumping case. In particular, it is possible that the AD duty will induce the subject country to shift its exports to other markets to make up for the lost market in the original importing country. For instance, if Country U imposes an AD duty t_J on country J; "trade deflection" measures the impact on imports from J to a 3rd country (country V, m_{JV}). Economic theory (Bown and Crowley, 2003) implies that the impact will be positive -- in other words, exporting countries will seek out new markets if their existing markets are shut off.

There are several related papers in the literature. Staiger and Wolak (1994) and Prusa (1997, 2001) document the first two impacts. Using information on US AD actions involving manufacturing products during 1980-85, Staiger and Wolak create a panel of 4-digit SIC industry-level import and output statistics. They find that an AD action

significantly lowers imports.[3] Prusa (2001) uses longer sample of US AD actions (1980-94) and estimates the trade effects of AD using a panel of TS-level import statistics. He finds that an AD duty lowers subject trade by about 50%. Prusa also finds that an AD duty causes imports from non-subject suppliers to increase 40-60%; in other words, for the US (a large market that many alternative suppliers are willing to service), AD duties result in a significant amount of trade diversion.

The Bown and Crowley study is unique in that it focuses on the impact of AD from a supplying country perspective. They assemble a 10-year panel of Japanese exports to various destination markets (by tariff code); they then estimate the bilateral trade effects as Japanese exporters experience protection in one (or more) foreign markets. They document significant deflection: the imposition of a US AD duty on Japan results in Japanese exporters increasing their shipments to non-US markets by 11-22%.

The Data

We began by using official WTO AD reports to compile a list of all countries who had filed hot-rolled AD actions during 1997-2001. With the disputes documented, we needed to gather detailed import statistics. The UN Commodity Trade Statistics Database (UN Comtrade) collects data on the volume of bilateral trade statistics between most countries.[4] Although we would have preferred to use monthly or quarterly time series data, we were constrained to use bilateral trade on an annual basis as that is the only way the data is reported by the UN. Various private companies maintain more disaggregate

[3] Staiger and Wolak's primary contribution is to highlight the trade effects during the investigation; they do not quantify the percentage change in subject imports during the subsequent years.
[4] See http://unstats.un.org/unsd/comtrade/ .

data on trade flows. This data would allow much more refined analysis of the trade effects, and should be the subject of further research.

Depending upon the level of aggregation for which we were willing to perform our analysis, we could have conceivably used the UN data to create a panel of trade flows dating back to the 1980s. As has been discussed in other work (Staiger and Wolak, 1994; Blonigen and Bown, 2002), when attempting to quantify the trade impact of AD disputes it is preferable to use line-item tariff level data because that is how AD duties are imposed. So, for this study we chose to collect hot-rolled imports at the HS tariff-line basis. One consequence of the decision to use HS level data is that we have a fairly short time series. The HS classification system was revised in 1996 which means that our hot-rolled statistics cover only years since 1996.[5] The shortness of the time series is compensated for by the richness of the trade relationships that we can exploit. Given the UN data we are able to compute bilateral trade patterns for hot-rolled steel involving 142 exporters and 112 importers.

In our regressions we want to control for exogenous factors that might influence trade patterns. Given the results of Knetter and Prusa (2002) we considered using the real exchange rate and real GDP. The best source for real exchange rates is Economic Research Service of the U.S. Department of Agriculture who has calculated bilateral real exchange rates for a large number of countries in a consistent fashion.[6] The exchange rate is defined as foreign currency per unit of domestic currency so that an increase in the exchange rate reflects an appreciation of the filing country's currency. Unfortunately, even though the ERS real exchange rate database is the most comprehensive available,

[5] The HS codes for hot-rolled steel are 720810, 720826, 720827, 720838, 720839, 720840, 720853, 720854, 720890.
[6] See http://www.ers.usda.gov/data/exchangerates/ .

there remain many countries that are missing.[7] As a result, we chose to not include the real exchange rate in the regressions as including it dramatically reduces our sample size.

By contrast, we were able to collect real GDP figures for almost every country in our sample. We used the International Monetary Fund's *The World Economic Outlook* (WEO) Database (April 2003) as the source of real GDP data for both the filing countries and the subject countries.[8]

An Initial Look at the Data

Before proceeding to the econometric specifications, we think it is useful to take a preliminary look at the trends in the data. We begin by looking Figure 2 where we depict the impact of hot-rolled AD investigations on a year-by-year basis. For each importing country we aggregated all exporting countries into two groups: those subject and those non-subject to AD actions in a given year. To make the figure easier to read, we then normalized the annual trade volumes for each group by the 1996 trade volume (i.e., indexed the import volume so that 1996=1 for both subject and non-subject suppliers), a normalization that makes the trends much easier to visualize. In particular, this presentation allows one easily to compare trends across subject and non-subject suppliers. In addition, it allows one easily to determine whether imports are larger or smaller than in the benchmark year, 1996.

As we mentioned above, our sample begins in 1996 simply because that is the time period for which the most detailed import statistics were available. Although primarily an attribute of the data availability, it turns out that using 1996 as a benchmark

[7] Compiling a complete set of real exchange rate series remains the subject of ongoing research.
[8] See http://www.imf.org/external/pubs/ft/weo/2003/01/data/ .

year is fortuitous. The year 1996 is an apt benchmark year not only because it preceded the "steel crisis" but also because it was a year of healthy profits for most steel firms. For example, in its initial investigation of hot-rolled steel completed in 1999, the U.S. International Trade Commission collected data from the U.S. steel industry that showed operating income of 2.3% in 1996 and 5.9% in 1997. For the U.S. steel industry 1996 and 1997 were both years of strong financial performance. Thus import volume at 1996 levels correspond to levels where there were no allegations of unfair trade involving hot-rolled steel and where most steel firms managed to turn an operating profit. Both are statements that that one can only rarely make.

Let's begin by looking at the 1997 panel. First, look at countries that were subject to AD investigations in 1997. We see that trade jumped sharply between 1996 and 1997 and then fell just as sharply in 1998 (i.e., once AD duties were imposed). By contrast, look at countries that were not subject to AD investigations in 1997. Their trade volume grew, but not nearly as noticeably as that for subject countries. In particular, there is no visual indication that they increased their shipments in response to the AD actions against the subject countries.

For the 1998 panel, we again see that subject countries trade volumes sharply increased (relative to non-subject countries) in the years preceding the AD actions. In 1999, subject volume falls precipitously (to almost zero) and then recovers over the next two years. Once again we see that non-subject country trade volume grows more slowly than subject countries. In contrast with the other three panels in the figure in the 1998 panel there appears to be an increase in non-subject shipments in the years following the

1998 actions (1999 and 2000). In other words, in 1998 there appears to be some visual confirmation of AD-induced diversion.

Interestingly, the 1999 panel appears to tell a somewhat different story than the other three panels. In particular, note that for the 1999 panel the subject import volume increase occurred in 1998; subject import volume declined in 1999, the year of the cases. In the other three panels imports increase until the year of the AD actions. Is there something fundamentally different in 1999? We don't think so. We believe that a qualitatively similar story is told in all the years. The complication stems from the timing of the case filings and the nature of our trade data. Here is the explanation. The trade UN trade data is only available on an annual basis; by contrast, the timing of the case filing (and any subsequent trade effects) are probably better thought of as occurring at quarterly or monthly basis. What we are saying is that the timing of the case can influence the trends. Specifically, in 1999 the AD actions were all filed during the first and second quarter; this means the AD actions would be expected to restrain trade during the 1999 sample year.[9] With this fact in mind the observed trend in the 1999 panel is not surprising. By contrast, in the other three panels the major AD disputes all occurred during the fourth quarter, which means that the trade impact would begin to be felt in the following year. And, this inference is exactly what the figures show. Hence, once we consider the timing of the filings the 1999 panel reflects the same type of trade impact witnessed in the other three panels. In future work using either monthly or quarterly time series, it would be useful to focus more precisely on the date of filing and the date that provisional and final duties are first imposed.

[9] Staiger and Wolak (1994) discuss this issue and go to great lengths in an attempt to adjust for the timing difference.

The 2000 panel again depicts the same trade pattern that we saw in the first two panels---namely, sharp increases in trade volume during the years preceding the AD actions and then, once the AD actions were brought, a reduction in imports that is as quick (or quicker) than the increase that preceded the filing of the cases.

By reviewing all four panels, one can also see hints of possible trade diversion. In each individual panel, we depict the trend in imports not subject to that particular case without any control for the effects of *additional* antidumping cases in later periods that may be suppressing or even decreasing imports in those later years. But if we look at the later panels, we can see evidence of increasing rates of growth. The 1998 panel shows a modest increase in 1997 but a much sharper increase in 1998 by those countries not being hit with antidumping cases, before subsequent antidumping measures shut down trade. The 2000 panel shows modest increases in 1997 and 1998, with much sharper increases in 1999 and 2000, before antidumping measures shut down trade. In other words, the earlier antidumping actions seem to have stimulated the rate of growth of imports by other non-subject countries. These non-subject imports could be growing for other reasons, but they are nonetheless growing.

Overall, Figure 2 leaves us with several thoughts. First, we will be surprised if the econometric estimates do not find strong evidence of trade depression. In each panel trade from countries subject to the AD actions falls sharply. Although we have not controlled for any other factors, the trends are so distinct that we fully expect our results to be consistent with previous findings on trade depression (Staiger and Wolak, 1994; Prusa, 1997, 2001).

Second, whether there is evidence of significant trade diversion is unclear. Although there are visual hints of trade diversion, the increases in non-subject imports could also simply reflect the trend over this period for more trade in hot-rolled steel as more and more countries sought export markets. If the econometric estimates find significant diversion, then the econometric and visual trends depicted a consistent and mutually reassuring story. On the other hand, if the econometric estimates do not find significant diversion, then we will be reminded why pictures alone are insufficient to make statistical judgments.

Third, the timing issue highlighted by the 1999 panel is a complicating factor that is beyond our ability to control with the data currently available. This graph highlights the importance of extending the analysis to more disaggregated data on a quarterly or monthly basis, to allow more refined study of the timing of key events.

While the overall trends are instructive, we find the US trends particular illustrative (Figure 3). The US is particularly apropos case study for several reasons. First, the wide availability of US data has made it the primary focus of previous research on the trade impact of AD. Second, the US steel industry is the most aggressive AD user in one of the most prolific AD using countries in the world. During the last half of the 1990s the US filed more AD complaints than any other country, and during this time about two-thirds of all US activity involved the steel industry. The size of the US market along with the US steel industry aggressive approach toward applying AD might mean that US trends differ from the rest of the world, especially from those of the new users. Third, and perhaps most simply, the US is the country with which both authors have most knowledge of its AD activity.

In Figure 3 we plot US hot-rolled steel imports. In the upper left corner we plot imports from all sources. Import volume grew sharply over the first two years of the sample and then fell even more sharply in 1999. In 2000 there was a fairly modest increase in import volume which was quickly and significantly reversed in 2001. By 2001 US hot-rolled imports were at their lowest level since the early 1990s.[10]

The overall trend is largely influenced by the US's use of AD. In late-1998 the US sought AD protection against imports from Brazil, Japan, and Russia. The upper right panel we breakout US imports into those from the three countries subject to the 1998 AD case and those from the nonsubject countries. As seen, the 1998 surge was due entirely to the imports from the subject countries; and, once the AD action was filed imports from the subject countries fell (almost to zero). Moreover, the 1998 case appears to have led to significant diversion as during 1999 and 2000 nonsubject imports rose, albeit not as sharply as the 1997-98 surge.

In response to the increase in imports from nonsubject countries, in late-2000 the US steel industry filed a second AD case against 12 countries. As shown in the lower left panel, the 2000 case sharply cut imports from the subject countries; this time following the case there was no noticeable subsequent increase from nonsubject countries.

Thus, the US experience with hot-rolled steel demonstrates the strong trade depression caused by AD actions; in both 1998 and 2000 imports from subject countries fell significantly following the filing of the case.

Indeed, Figure 4 demonstrates just how aggressively the U.S. steel industry "polices" its home market. The 1998 case targeted three of the four largest import sources. Russia and Japan stand out, both as a share of the total import market and based

[10] Data on this point appears in the USITC report 3479 (TA-201-73).

on their growing import volume. The 2000 case, however, is more interesting. Any country that had the audacity to increase its exports to the U.S. market found itself targeted for a second round of antidumping actions.

Evidence of import diversion is somewhat mixed. There appears to be significant diversion in 1998 but not in 2000. Any conclusions about 2000, however, must be tempered for two reasons. First, our sample ends in 2001 and thus provides only a very brief window to measure effects. Second, in 2001 total demand for steel in the United States began to fall for the first time in years. Total apparent consumption of hot-rolled steel fell from __ million tons to only __ millions tons <<get data from CRU or ITC safeguard report>>. Thus all exporters were selling into weaker market in 2001.

Finally, by focusing solely on the US we can examine whether US AD actions induced trade deflection. In the lower right panel we graph the exports of the three countries subject to the 1998 case (Brazil, Japan, and Russia) to non-US markets. There appears to be a significant amount of trade deflection, especially by Japan and Russia who increase their exports in 1999 and 2000.

All things considered, this review of world and US import trends suggests evidence of each of the three potential trade effects. The strongest evidence emerges for significant trade depression: looking at either the world or US data we see sharp fall in imports from subject countries following the AD action. Evidence of import diversion is somewhat more mixed. Looking at the world data we see some increase by non-subject suppliers; looking at the US data, on the other hand, there appears to be stronger evidence of significant diversion in 1998 but weak evidence in 2000. Finally, with respect to the US data, the data suggests that AD measures do deflect trade from one market to another.

Dynamic Panel Estimation

Our empirical model will measure the impact of AD actions on bilateral trade patterns. As discussed above, we constructed a panel dataset of exports from an exporting-selling country *s* to an importing-buying country *b*. The panel includes trade data on almost every country that either bought or sold hot-rolled steel during the period 1996-2001 and will allow us to identify all three potential impacts of AD protection, depression, diversion, and deflection. Our basic specification estimates an autoregressive model of the form

$$y_{it} = \sum_{\tau=1}^{p} \alpha_\tau y_{it-\tau} + \beta' x_{it} + \eta_i + \nu_{it}, \qquad t = 1996, 1997, ..., 2001. \tag{1}$$

where y_{it} is measures (the log of) bilateral imports between each country-pair at time t, α_τ and p are parameters to be estimated, x_{it} is a vector of exogenous variables, $\eta_i \sim IID(0,\sigma_\eta^2)$ denotes a country-pair specific residual (a fixed effect), and ν_{it} is residual term with the usual properties, $\nu_{it} \sim IID(0,\sigma_\nu^2)$.

The fixed effects (FE) estimator is a standard way of estimating (1) since it eliminates η_i. However, in our application the FE estimator will be biased and potentially inconsistent since y_{it-1} will be correlated with the FE-transformed residual. The extent of the inconsistency varies from application to application, but in general the problem will be less serious the longer is the time series (Kiviet, 1995). Given the relatively short length of the time series it is necessary to account for this potential problem.

First differencing equation (1) removes the η_i and produces an equation that is estimable by instrumental variables. Arellano and Bond (1991) and Ahn and Schmidt (1993) derive a General Method of Moments (GMM) estimator using lagged levels of the

dependent variable and the differences of the exogenous variables.[11] Using the test for autocovariance in the residuals derived by Arellano and Bond we find that p=2 is the appropriate specification for our panel of hot-rolled trade data.

The estimation results are reported in Table 3. In the first three columns we estimate using data from all importing countries; in the last three columns we restrict our sample to just US imports. In each specification we include the autoregressive terms, a series of dummy variables to estimate the trade impact of AD action, and year effects. The first set of dummies indicates whether a supplying country is subject to an AD investigation in the current year (year t), or was subject to an AD investigation in either of the two following years (which we denote as years t-1 and t-2). For instance, in the case of Brazil servicing the US market, the dummies will measure the impact on Brazil-US hot-rolled trade in t=1998 (the year of the investigation). The dummies will also measure trade impact during the following two years (1999, and 2000).[12] The series of dummy variables will therefore measure the trade depression caused by AD.

The second set of dummies indicates whether a supplying country was not subject to an AD investigation in the current year or in either of the two following years. For example, in the case the US market, South Korea (along with many other supplying countries) was not subject to the 1998 AD investigation. The dummies will measure the impact on South Korea in 1998, 1999, and 2000. These dummy variables will therefore measure the trade diversion caused by AD.

[11] See Hsiao (1986) and Baltagi (1995) for a more complete discussion of the estimation of dynamic panel models and the construction of valid instruments.
[12] In 1999 the AD action occurred in the prior year (t-1); in 2000, the AD action occurred two years earlier (t-2).

The third set of dummies indicates whether a supplying country that is subject to an AD investigation increases its sales to 3rd countries. For instance, in the case of Brazil being subject to the 1998 US AD investigation, the dummies will measure the impact on Brazilian hot-rolled trade to France, Germany, Venezuela, etc. These dummy variables will therefore measure the trade deflection caused by AD.

Our benchmark estimation is given in specification A where we include just the autoregressive terms and the AD and year dummies. In specification B we include (the log of) GDP for both the buying and supplying countries in an attempt to control for country-level economic factors that might drive bilateral trade. As discussed above, we would have liked to also control for the real exchange rate, but the limited scope resulted in a dramatic reduction in our sample size. Given that we are controlling for the import trends during the prior two years our hope is that this omission affects the parameter results, the primary impact is on the estimates on the lagged trade and not the estimates of the AD dummies. Finally in specification C we report OLS estimates to illustrate the significant biases that result if one fails to control for the endogeneity issue.

As it turns out, the parameter estimates are quite similar in specification A and B. The point estimates are comparable and the statistical significance of the parameters is unaffected. We note that one must transform the parameters on the dummy variables given the semi-logarithmic functional form (Kennedy, 1981). The implied percentage in bilateral trade volume is reported in the bottom panel of the table.

Looking first at the estimates for trade depression, we find large negative effects in the filing year and for each of the next two years. The coefficients are statistically significant in the filing year and the following year. Our estimates imply that subject

country trade falls by about 75% (relative to what it otherwise would be) in the year the case was filed. We find in the first full year following the investigation trade is reduced by almost 85% (relative to what it otherwise would be). In the second year following the investigation trade is reduced by about 65%. These are extraordinarily large impacts. By comparison, using similar methodology but a large sample of US cases Prusa (2001) estimates that trade falls by 40-66% during the first three years. Our estimates are 50 to 100 percent large than these earlier estimates.

We believe there are several reasons why the parameter estimates based on our hot-rolled steel data are larger than the earlier results. First, as a general matter, AD margins have increased over time. Blonigen (2002) documents the dramatic increase in US margins over the past two decades noting that in recent years the average dumping margin has been around 65%. Our sense is that the same is true in other markets as more countries become antidumping users. For instance, the average AD margin imposed by India is over 80%. Given duties of these sizes, a finding that AD didn't dramatically reduce trade would be more surprising than our findings which imply that the subject countries are essentially removed from the market.

Second, in contrast with many other products under AD investigation, hot-rolled steel is a fairly homogenous product. Every steel producing country can make hot-rolled steel and the hot-rolled product produced by one supplier is essentially substitutable with the hot-rolled product produced by most other suppliers. Unlike many other products for which the buyer may have little choice but to pay the duty, buyers have many alternative sources of hot-rolled steel. Therefore, it may be easier for buyers to switch suppliers based on small price differences; said differently, the response of subject import may be

more elastic for hot-rolled steel than for other products that have been subject to AD investigations.

Third, hot-rolled steel cannot be easily adapted to take it outside the scope of an antidumping order. The legal definitions of the scope are often quite precise. For some products the addition of a new feature might take the product outside the scope of the order. Alternatively, shifting to an earlier stage or a later stage in the overall production process might take a product outside the scope. Neither of these options works for hot-rolled steel.[13]

In light of this discussion, it is perhaps surprising that we find no evidence of an increase in hot-rolled supply by non-subject countries, at least not on the global level. In particular, our estimates of import diversion imply that non-subject supplies *decrease* their shipments in response to an order on other countries! Although the estimates are statistically significant only for the first lag, it still is a surprising finding.

Several comments are in order. First, our estimates do not control for the fact that in a number of cases a number of the non-subject suppliers were already under AD orders. For example, in the 1Q-2001 Canada filed an AD case against 13 suppliers. Should we expect the countries not subject to the 2001 case to be affected? Perhaps, but four of the biggest non-subject suppliers (France, Russia, Romania, Slovakia) were already subject to AD duties dating back to a 1998 case. In effect, one reason why we do

[13] Actually, in the early 1990s some steel exporters focused on the precise definition of the chemistry of carbon steel, and discovered that steel made with certain amounts of alloying elements such as boron would transform "carbon steel" into "alloy steel" for purposes of the tariff code and antidumping orders. In more recent steel cases, however, the U.S. steel industry has defined the chemistry of "carbon steel" so broadly that any steel falling outside these broad ranges can no longer function physically and metalurgically as carbon steel.

not find trade diversion is that many non-subject suppliers could not increase their shipments because they already are subject to AD orders.

Second, at least for the case of hot-rolled steel in the late 1990s we think the "negative" result with respect to non-subject suppliers captures a previous ignored aspect of AD. Namely, aggressive use of AD measures such as those the world experienced during the late 1990s can create a "fear factor" in the market. That is, even if a foreign supplier could increase its shipments, it may choose not to avoid being the next country to be put under the antidumping microscope. Put another way, the short run increase in profits from increased shipments may be dominated by the long-term losses associated with AD penalties.

Consider again Figure 4 showing the countries hit and spared by U.S. antidumping measures. Two features stand out. First, South Korea avoided becoming a target. The largest steel exporter in South Korea, POSCO, ships almost exclusively to a joint venture in California that used POSCO hot-rolled steel as a feedstock for producing downstream products to sell on the US west coast. By limiting itself to this narrow niche, even though it could easily increase its exports and win sales, POSCO has successfully avoided an antidumping case on hot-rolled steel.

Second, the targets of the 2000 case are an interesting group. Of those countries that had any increase at all, 9 out of 19 countries were hit by an antidumping petition. Seen another way, of those countries with more than 1% of the U.S. import market, 9 out of 19 countries were hit by an antidumping petition.[14] In such a world, it is not wonder that many countries engage in self restraint to avoid becoming a target.

[14] It is a coincidence that both measures have the same 9 of 19 finding.

This effect is subtle. It would be difficult to tease out of annual data any direct measurement of this "fear factor." But future research with more detailed quarterly or monthly data may be able to measure this effect more directly.

All of this aside, we were nonetheless concerned that our somewhat surprising estimate was perhaps an indication that our model was mis-specified. To check, we decided to re-run the model restricting the sample to just the US as an importing country. Thus, in these restricted runs we have a panel of one buyer and approximately 50 supplying countries. Given our knowledge of the US hot-rolled market and the trends depicted in Figure 3, we would be concerned if we saw no evidence of diversion. The results are presented in columns D, E, and F in Table 3. Column D (E) (F) is analogous to column A (B) (C). As seen, the results are consistent with the results found in Prusa (2001). Namely, we find that there is a significant amount of diversion in the year following the case. In fact, the estimated impact is larger than that reported in Prusa (2001). This is probably due to the fact that Prusa (2001) aggregates all nonsubject suppliers together in his estimation while in this paper we include each nonsubject supplier separately. As a result, the same increase in import volume will translate into a larger percentage change (as reported here) because many of the non-subject suppliers are quite small.

Finally, we are also able to estimate the trade deflection effect. We find that an AD action in one market causes the subject suppliers to increase their shipments to other markets by about 25-30% in the years following the investigation. This is qualitatively similar to the finding in Bown and Crowley but somewhat larger. As discussed above,

this is entirely plausible as hot-rolled steel is a fairly homogenous product where one should not be surprised to see suppliers look for other markets.

Interestingly, when we restrict our sample to just the US market, we find no real evidence of import deflection. That is, on average it appears that AD actions induce trade deflection, but there is no such evidence from US actions. Note, that we have restricted our sample to only US imports; hence, our trade deflection measure is capturing whether other countries have increased their shipments to the US as a result of other countries use of AD.

IV. Concluding Comments

Scholarly efforts to measure the trade effects of AD measures have made progress, but still have a number of areas to pursue further. Based on our work to date, we offering the following thoughts for future work in this area.

First, trade depression continues to be an important topic to understand better. More disaggregated data would allow better analysis of the effects of different stages in the anti-dumping investigation process. But more importantly, scholar should begin to study more closely the factors that affect the degree of trade depression. Obviously the level of the dumping margin is an important factor, but many other factors also play a role. Each country's legal system has features that make anti-dumping duties more or less trade restrictive. For example, the U.S. system of retrospective assessment introduces so much uncertainty into the determination of actual duties, the uncertainty has an additional chilling effect on trade.

The nature of the product also matters a great deal. For some products, exporters just continue shipping. For example, after the recent U.S. anti-dumping case on softwood lumber from Canada, imports grew and did not fall at all. This result may seem counterintuitive, but there is a reason. By increasing production volume enough, many Canadian companies hoped to lower per unit cost enough to significantly reduce their dumping margins and receive some of the deposited duties back as refunds.

The country involved can also matter a great deal. For example, Chinese exporters are known for their willingness to continue exporting even in the face of large anti-dumping duties. Perhaps it is that Chinese costs are so low that the final price is competitive, even with the extra duties. Perhaps Chinese companies and their importers are just more reckless. Whatever the reason, they continue exporting.

The challenge for scholars is to find ways to study these features and understand better the other factors affecting trade flows. It would be useful to begin such work with specific trading countries, but the work should then expand to a more global approach.

Trade diversion is also an important real world phenomenon. One goal of future research should be to separate out the different effects. Do other exporters see an opportunity to be seized, or sense a trap that should be avoided? Do some countries exercise more caution than others? For example, do frequent targets of anti-dumping actions, such as POSCO in Korea, become quite savy about when and when not to export?

But once we understand the dynamic, the next challenge is to better understand the welfare implications of these effects. Scholars have studied the welfare effects of the direct trade depression effects. But if an anti-dumping action causes other countries to

begin exerting self-restraint and limit their exports, what additional welfare consequences arise from this indirect effect?

Trade deflection is another new, but important phenomenon. Many national legal systems have begun to build trade deflection concerns into the law. For example, under U.S. law, the existence of a trade remedy in another country can be used as evidence that exporters will begin to divert their shipments to the U.S. market, and thus threaten the U.S. industry. As is so often the case, trade remedy laws begin to address problems before there is even a consensus that a problem really exists. But since the law makes this factor relevant, we need to understand it better. Does it occur? If so, how frequently and with what magnitude? Are there industry features that make trade deflection more or less likely? Can those features be operationalized?

In a sense, that is the ultimate challenge for scholars in the field of trade remedies. How do we take the scholarship, and use to shape practical rules or suggestions for how the law and policies ought to develop? In the field of anti-trust law, economists have offered many concrete guidelines to courts seeking to identify when might predatory pricing or some other anti-competitive conduct possibly be a concern. It would be useful for economists in the field of international trade to begin developing similar types of practical guidelines. Such work would be particularly helpful for the negotiations in Geneva to reshape the international rules of anti-dumping.

The anti-dumping laws have been around for a long time. But the serious study of anti-dumping laws and measures is really just beginning.

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Figure 1: Real Exchange Rate

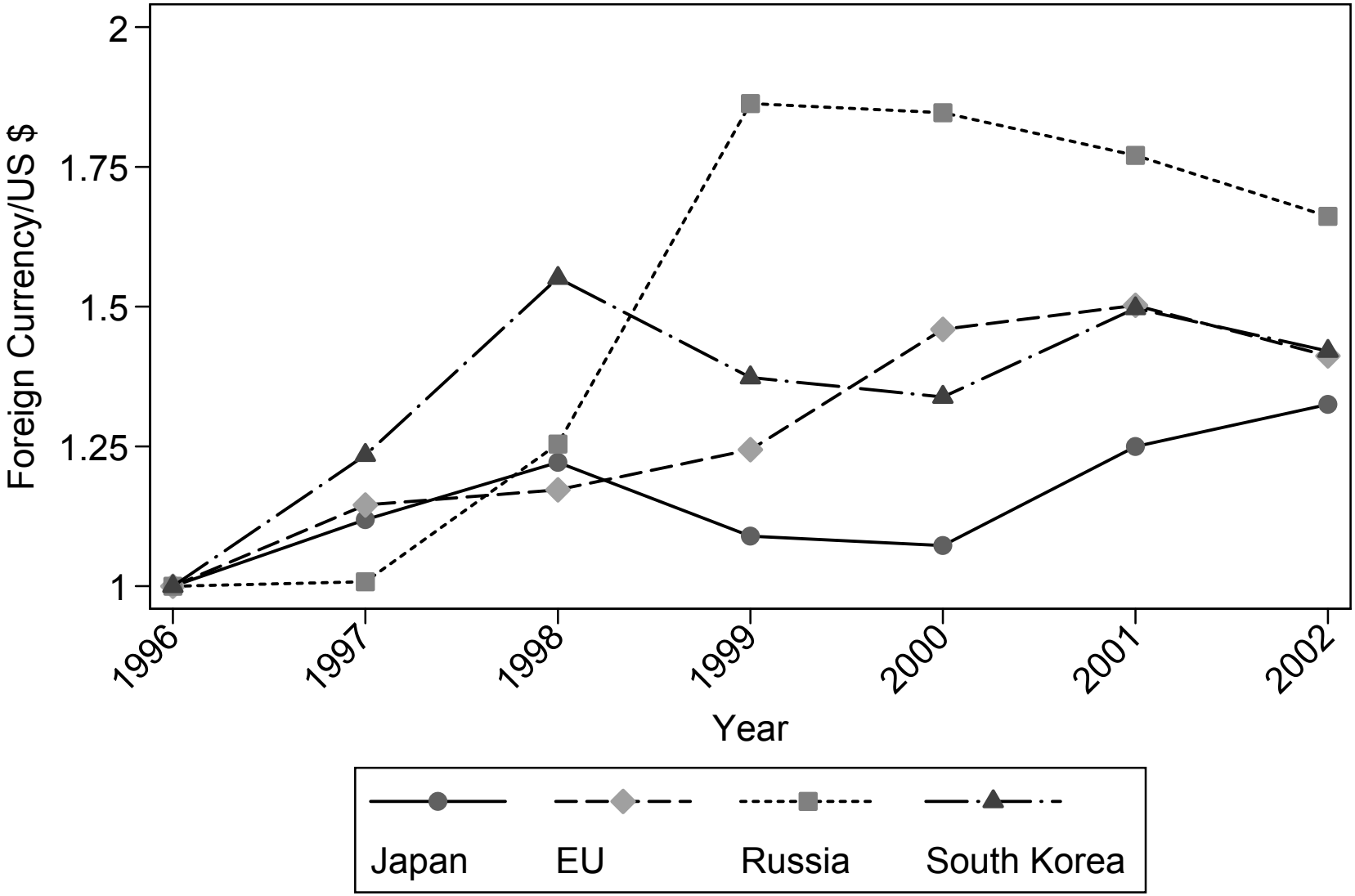
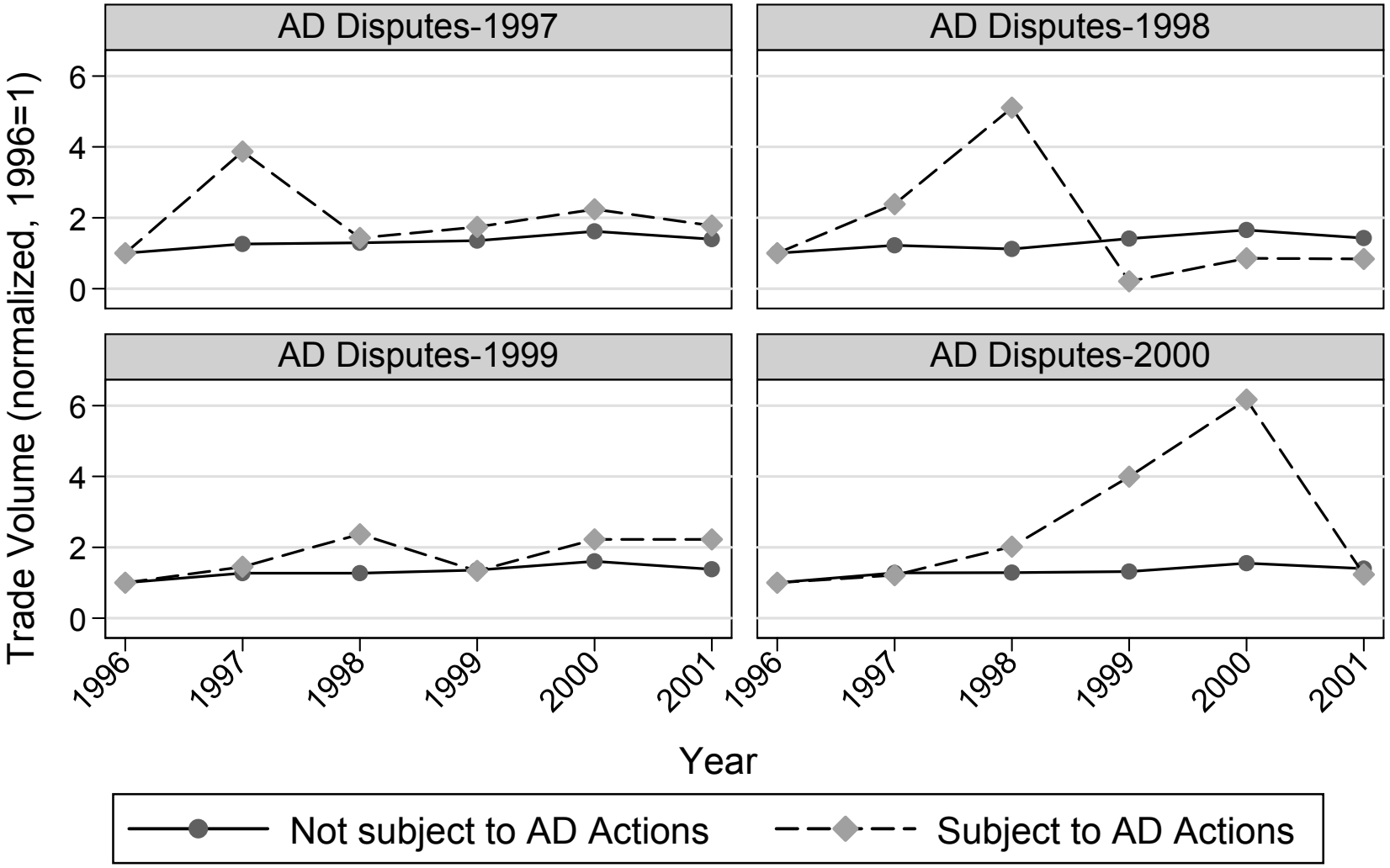
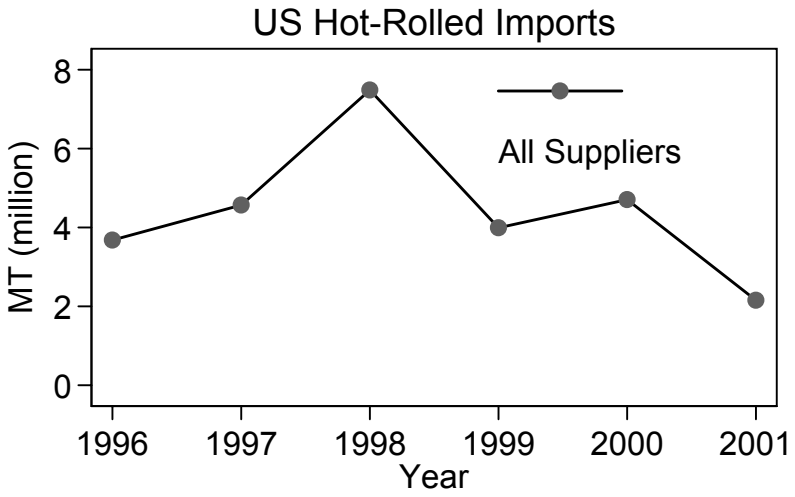


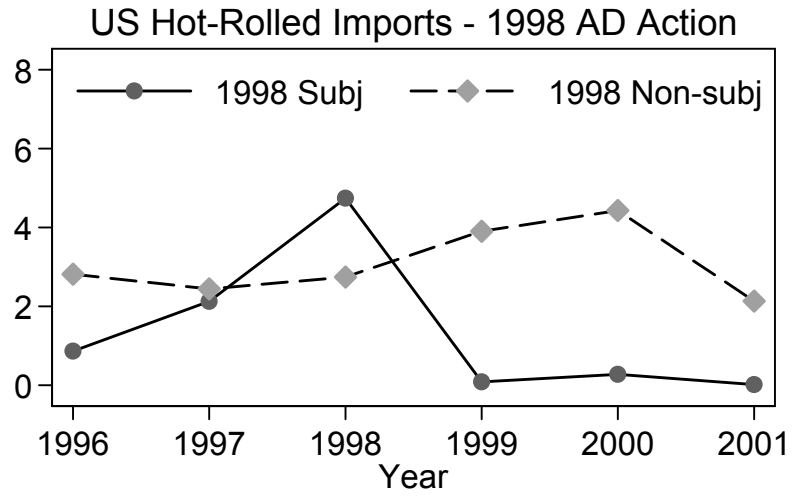
Figure 2: Trade impact of AD actions (all suppliers & buyers)

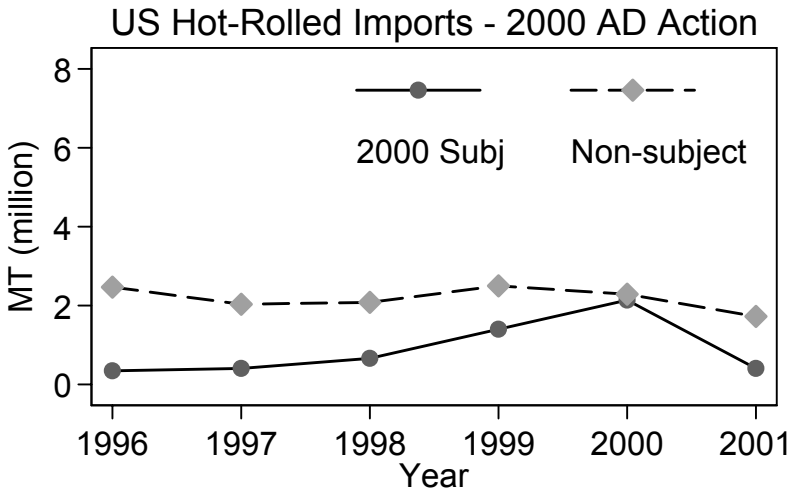


Graphs by year of potential AD dispute

Figure 3: Trade Depression, Diversion, and Deflection







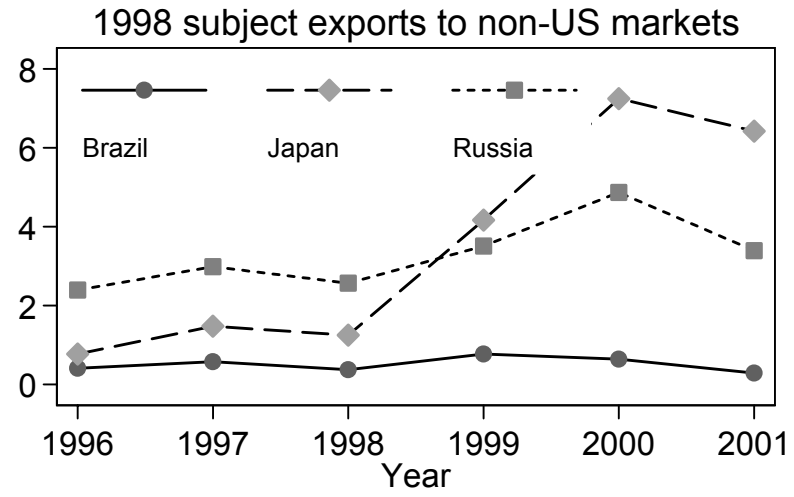
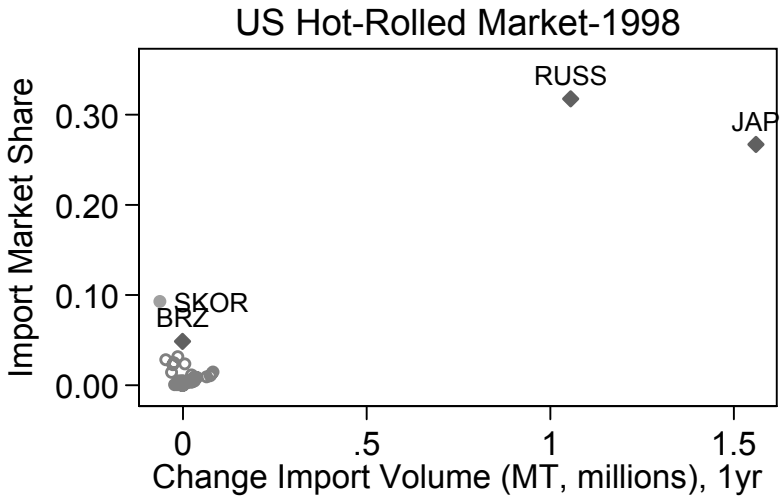
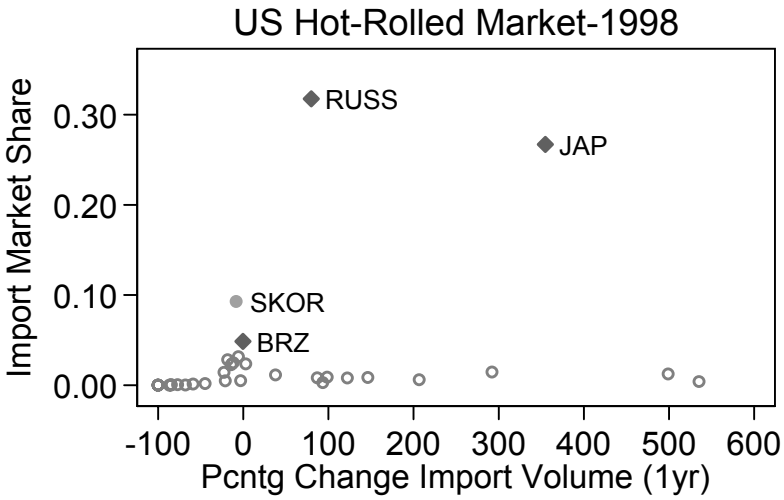
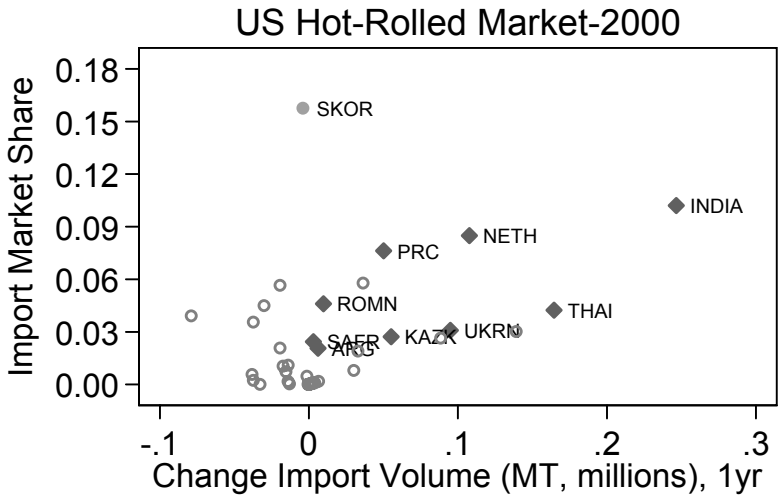


Figure 4: Size Matters







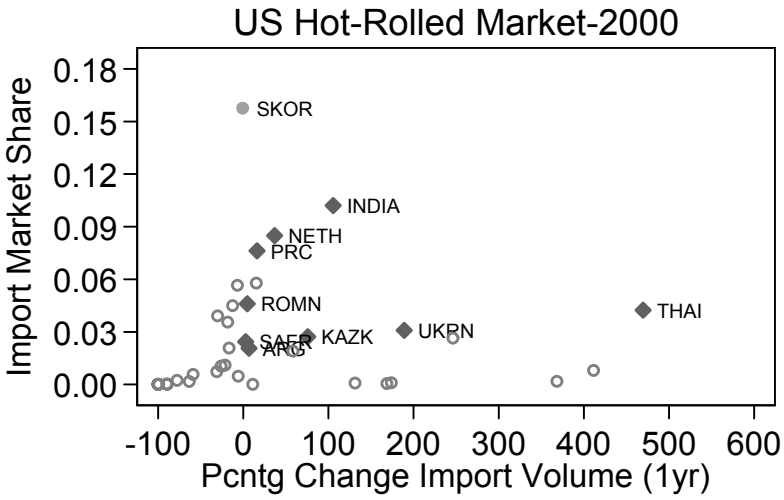


Table 1: Chronology of Hot-Rolled Antidumping Disputes
Sorted by Filing Country

Date	Filer	Subject Country(ies)
4Q1997	India	Kazakhstan, Ukraine, Russia
	Thailand	Bulgaria
2Q1998	Venezuela	Kazakhstan, Ukraine, Russia
	S. Africa	Brazil, Ukraine, Russia
4Q1998	Argentina	Brazil, Russia, Ukraine
	Brazil	Germany
	USA	Russia, Brazil, Japan
	Mexico	USA
	Canada	France, Russia, Romania, Slovakia
1Q1999	EU	Taiwan, Iran, Bulgaria, South Africa, India, Yugoslavia
	Mexico	Russia, Ukraine
	Peru	Russia, Ukraine
	Philippines	Russia
2Q1999	EU	Romania, India, PRC
1Q2000	Colombia	Kazakhstan, Ukraine, Russia
2Q2000	Argentina	Brazil, South Africa, Czech Republic, Romania, Russia, Turkey
4Q2000	Argentina	Kazakhstan, Romania, Slovakia, South Africa
	USA	Kazakhstan, South Africa, PRC, Indonesia, Ukraine, Taiwan, Thailand, India, Netherlands, Romania, Argentina, Indonesia
1Q2001	Canada	Brazil, Taiwan, Yugoslavia, South Africa, PRC, Ukraine, Bulgaria, South Korea, India, New Zealand, Saudi Arabia, Macedonia, Thailand
	Venezuela	Romania
2Q2001	Peru	Kazakhstan, Romania
4Q2001	EU	South Africa, Egypt, Hungary, Turkey, Libya, Iran, Slovakia

Table 2: Chronology of Hot-Rolled Antidumping Disputes
Sorted by Subject Country

Subject Cnty	Date	Filer(s)
Argentina	4Q2000	USA
Brazil	2Q1998	South Africa
	4Q1998	Argentina, USA
	2Q2000	Argentina
	1Q2001	Canada
Bulgaria	4Q1997	Thailand
	1Q1999	EU
	1Q2001	Canada
Czech Rep	2Q2000	Argentina
Egypt	4Q2001	EU
France	4Q1998	Canada
Germany	4Q1998	Brazil
Hungary	4Q2001	EU
India	1Q1999	EU
	2Q1999	EU
	4Q2000	USA
	1Q2001	Canada
Indonesia	4Q2000	USA
Iran	1Q1999	EU
	4Q2001	EU
Japan	4Q1998	USA
Kazakhstan	4Q1997	India
	2Q1998	Venezuela
	1Q2000	Colombia
	4Q2000	Argentina, USA
	2Q2001	Peru
Libya	4Q2001	EU
Macedonia	1Q2001	Canada
Netherlands	4Q2000	USA
New Zealand	1Q2001	Canada
PRC	2Q1999	EU
	4Q2000	USA
	1Q2001	Canada
Romania	4Q1998	Canada
	2Q1999	EU
	2Q2000	Argentina
	4Q2000	Argentina, USA
	1Q2001	Venezuela
	2Q2001	Peru

Subject Cnty	Date	Filer(s)
Russia	4Q1997	India
	2Q1998	South Africa, Venezuela
	4Q1998	Argentina, Canada, USA
	1Q1999	Mexico, Peru, Philippines
	1Q2000	Colombia
	2Q2000	Argentina
Saudi Arabia	1Q2001	Canada
Slovakia	4Q1998	Canada
	4Q2000	Argentina
	4Q2001	EU
South Africa	1Q1999	EU
	2Q2000	Argentina
	4Q2000	Argentina, USA
	1Q2001	Canada
	4Q2001	EU
South Korea	1Q2001	Canada
Taiwan	1Q1999	EU
	4Q2000	USA
	1Q2001	Canada
Thailand	4Q2000	USA
	1Q2001	Canada
Turkey	2Q2000	Argentina
	4Q2001	EU
Ukraine	4Q1997	India
	2Q1998	South Africa, Venezuela
	4Q1998	Argentina
	1Q1999	Mexico, Peru
	1Q2000	Colombia
	4Q2000	USA
	1Q2001	Canada
USA	4Q1998	Mexico
Yugoslavia	1Q1999	EU
	1Q2001	Canada

Table 3 - Hot-Rolled Steel
Arellano & Bond Estimation Procedure

	Specification	A All A-Bond	B All A-Bond	C All OLS	D US Only A-Bond	E US Only A-Bond	F US Only OLS
	Trade Volume, lag 1	0.343	0.317	0.422	0.102	0.238	0.512
		[0.055]***	[0.058]***	[0.010]***	[0.225]	[0.241]	[0.068]***
	Trade Volume, lag 2	0.128	0.127	0.22	0.105	0.145	0.202
		[0.030]***	[0.031]***	[0.010]***	[0.084]	[0.084]*	[0.066]***
Depressoin	AD investigation	-1.235	-1.166	1.301	-3.648	-4.68	0.252
		[0.570]**	[0.586]**	[0.387]***	[2.319]	[2.448]*	[2.237]
	AD investigation, lag 1	-1.778	-1.823	-0.19	0.485	0.107	0.12
		[0.574]***	[0.599]***	[0.381]	[1.684]	[1.402]	[1.934]
	AD investigation, lag 2	-0.815	-0.908	-0.087	-0.814	-1.04	-0.401
		[0.689]	[0.709]	[0.440]	[2.878]	[2.723]	[2.022]
Diversion	AD investigation (other country)	-0.142	-0.147	0.614	-3.549	-3.858	-0.972
		[0.200]	[0.203]	[0.145]***	[2.140]*	[2.188]*	[2.111]
	AD investigation (other country), lag 1	-0.663	-0.621	0.497	3.132	3.591	2.066
		[0.226]***	[0.230]***	[0.136]***	[1.631]*	[1.423]**	[1.819]
	AD investigation (other country), lag 2	-0.327	-0.329	0.417	3.972	4.626	1.176
		[0.210]	[0.215]	[0.146]***	[2.556]	[2.349]**	[1.836]
Deflection	Third country AD investigation	0.026	0.089	0.388	-0.152	-0.485	1.256
		[0.142]	[0.152]	[0.090]***	[0.503]	[0.572]	[0.627]**
	Third country AD investigation, lag 1	0.271	0.289	0.534	-0.172	-0.233	0.726
		[0.139]*	[0.146]**	[0.087]***	[0.583]	[0.601]	[0.609]
	Third country AD investigation, lag 2	0.278	0.225	0.358	-0.599	-0.213	-0.082
		[0.138]**	[0.148]	[0.097]***	[0.724]	[0.739]	[0.781]
	Importing country GDP		3.307	7.092			
			[2.416]	[1.040]***			
	Importing country GDP, lag 1		-5.06	-6.98			
			[1.810]***	[1.478]***			
	Importing country GDP, lag 2		1.459	-0.028			
			[1.333]	[0.925]			
	Exporting country GDP		-4.746	-1.793	-7.98		-0.322
			[2.507]*	[1.211]	[9.191]		[6.713]
	Exporting country GDP, lag 1		0.766	-0.202	-1.882		-8.648
			[2.316]	[1.763]	[5.907]		[9.696]
	Exporting country GDP, lag 2		0.879	2.11	0.497		9.363
			[1.977]	[1.017]**	[5.125]		[5.829]
	Constant	0.264	0.308	-3.102	-1.563	-2.181	-9.984
		[0.147]*	[0.145]**	[0.657]***	[1.256]	[1.120]*	[4.286]**
	Observations	5,171	4,662	9,075	163	169	247
	Number of groups	1,839	1,650	2,204	48	50	53
	Wald Test		to be filled in				

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Year Dummies included in all specifications but not reported

	Implied %Change Impact of						
Depression	AD investigation	-0.753	-0.738	2.408	-0.998	-1.000	-0.895
	AD investigation, lag 1	-0.857	-0.865	-0.231	-0.607	-0.583	-0.826
	AD investigation, lag 2	-0.651	-0.686	-0.168	-0.993	-0.991	-0.913
Diversion	AD investigation (other country)	-0.150	-0.154	0.828	-0.997	-0.998	-0.959
	AD investigation (other country), lag 1	-0.498	-0.477	0.629	5.061	12.178	0.509
	AD investigation (other country), lag 2	-0.295	-0.297	0.501	1.025	5.470	-0.399
Deflection	Third country AD investigation	0.016	0.081	0.468	-0.243	-0.477	1.885
	Third country AD investigation, lag 1	0.299	0.321	0.699	-0.290	-0.339	0.717
	Third country AD investigation, lag 2	0.308	0.239	0.424	-0.577	-0.385	-0.321