Antidumping*

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Abstract: We review the growing literature on the effects of antidumping, a trade policy that has emerged as the most serious impediment to international trade. Over the past 25 years countries have increasingly turned to antidumping in order to offer protection to import-competing industries. Antidumping is a trade policy where the institutional process surrounding the investigation and determinations has significant impacts beyond the antidumping duty we observe, and where the filing decision, the legal determination, and the protective impact are all endogenous with firms' decisions in the market, leading to a wealth of potential strategic actions and distorted market outcomes. This theme underlies our discussion as we review the literature in three broad areas connected with different phases of the antidumping trade policy process: 1) pre-investigation, 2) investigation, and 3) post-investigation.

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1. Introduction.

Over the past 25 years antidumping (AD) has emerged as the most widespread impediment to trade. While most other instruments of trade protection, such as tariffs, quotas, voluntary export restraints, etc., have been brought under greater GATT/WTO discipline, AD actions have flourished. Consider, for instance, that since 1980 GATT/WTO members have filed more complaints under the AD statute than under all other trade laws combined, or that more AD duties are now levied in any one year worldwide than were levied in the entire period 1947-1970. Using a computable general equilibrium model, Gallaway, Blonigen, and Flynn (1999) estimate that only the Multifiber Arrangement imposes larger welfare costs on the US economy than do AD actions and worldwide AD is likely the most costly form of protection.

If for no other reason, the widespread use of AD protection would make it an important research topic. As it turns out, however, AD is an important policy to study for many other reasons. While political-economy factors influence all forms of trade protection, no other trade instrument has AD's unique combination of political and economic manipulability, incentives, and intrigue. As we will detail below, AD protection is an excellent case study of almost all the standard microeconomic problems and concepts: From moral hazard, adverse selection, signaling, and contract theory to optimal tariff theory, comparative advantage, predatory pricing, and rent-seeking. This list does not even mention the political-economy issues generated by AD law: Legislative delegation, bureaucratic oversight and discretion, log-rolling, and favoritism.

Moreover, the GATT/WTO AD code has undergone significant revisions every negotiating round. Individual countries, especially the US and EU, frequently amend their AD statutes, almost always to make AD protection easier to grant. Not only does AD law allow politicians to offer politically preferred industries protection without blatantly violating GATT/WTO principles, but they can also tinker with the rules to broaden the scope and availability of AD protection. As an example, the US has amended its AD rules at least a half dozen times over the past 25 years. Imports can now be deemed "unfair" even if foreign firms charge higher prices to their export market than they do at home and even if foreign firms earn healthy profits on each and every foreign sale. To politically powerful industries, losing a case is not a sign that the foreign competition is traded fairly; rather it is simply a sign that the law needs changing.

AD is a trade policy where the filing, the legal decision, and the protective impact is endogenous. A foreign industry can almost guarantee it will not be subject to AD duties if it charges sufficiently high prices in its export markets. On the other hand, a domestic industry might resist lowering its prices because doing so improves its chances of winning an AD case. In addition, the same industry might lay-off more workers than expected because doing so indicates injury.

Once the AD case has been filed, the decision to grant protection is subject to substantial discretion and, hence, can be influenced by the involved parties. Foreign parties can choose not to participate in the dumping margin phase of the investigation. This might be interpreted as an admission of guilt, but it can also signal their confidence in the facts (or perhaps the futility of resistance). Domestic parties can urge politicians to pressure the bureaucratic agencies by using the rhetoric of foreign unfairness to provide a vehicle for building a political case for protection.

Once an AD duty is in place, a foreign firm can often alter its pricing strategies to completely avoid paying the duty. That is, even though an AD duty is very similar to a tariff, the government may end up collecting no duties even though imports continue to enter the domestic market. Alternatively, a foreign firm can "jump" the AD duties and relocate its production to either the domestic market or to a third country that is not subject to the duties. In other words, AD can change the incentives to make foreign direct investments. If foreign firms differ in their ability to make such investments, then AD might particularly burden firms who cannot make such adjustments. Ironically, this means the foreign firms who are most able to "jump" the AD duty potentially have an incentive to encourage AD actions.

In this paper we summarize the literature on AD and try to point out important research questions that remain unanswered. As our title indicates, this is a paper about antidumping, not dumping. There are two main reasons for our exclusive focus on AD actions. First, while there have a been a handful of important papers explaining why firms dump, the research focus has been overwhelmingly focused on the impact of AD. Second, given the substantial revisions to the GATT/WTO statutes over the past 25 years, the legal definition of "dumping" (and hence what actions can be sanctioned via antidumping actions) is almost completely divorced from any economic notion of dumping. Foreign firms who charge not only higher prices abroad than they do at home, but also higher prices than their domestic competitors, are still saddled with dumping margins of 50 percent and higher. AD no longer has anything to do with predatory

pricing. Even more to the point, all but AD's staunchest supporters agree that AD has nothing to do with keeping trade "fair." AD has nothing to do with moral right or wrong, it is simply another tool to improve the competitive position of the complainant against other companies. As Stiglitz (1997) argues, there is essentially no connection between national welfare considerations and AD protection. It is simply a modern form of protection. As a result, there is little logical reason to necessarily connect the dumping literature with our review of the AD literature.

Finally, although the economic issues stemming from AD law are common to all GATT/WTO members, almost all research has focused on AD use in the US and EU. Thus, much of our discussion below suffers from this bias. We take special effort to try to clarify when we are making statements about GATT/WTO rules and when our discussion is limited to the US and EU experience.

The paper is organized as follows. In the next section we review some of the trends in the use of AD. As we will discuss, AD was essentially an irrelevant, rarely used trade law until the mid-1970s. However, due to the fall in tariffs countries increasingly felt the need to offer protection to import-competing industries. Even though the GATT explicitly designed safeguard protection for these situations, AD has a number of advantages that have made it particularly popular. The remaining topics we organize by "time." In section 3 we review literature that has studied the impact of AD law before a case is even filed. We will explain how AD can facilitate collusion and can distort market prices even if cases are never filed. We will also explain how the trade impact of macroeconomic shocks, such as exchange rate movements and GNP fluctuations, are complicated by the presence of AD law. In section 4 we consider the AD investigation. We will explain what factors appear to be most important for the determination of injury and also what influences whether domestic and foreign parties participate in the investigation process. In section 5 we assess the market effect of AD protection. AD duties affect both the trade from subject countries and also the imports from non-subject countries. AD duties also encourage foreign firms to invest in protected domestic markets. We also discuss how the assessment of AD duties greatly complicates the pass-through behavior of sanctioned firms. Finally, in section 6 we summarize the state of the literature and highlight some open issues and puzzles that need to be addressed.

2. Trends in the Use of Antidumping.

While the first antidumping legislation dates to Canada's legislation in 1904, the modern history of AD begins with the 1947 GATT agreement. Largely at the insistence of the US, the original GATT agreement included provisions for the imposition of AD duties.[1] The 1947 GATT agreement defined dumping as the practice whereby the "products of one country are introduced into the commerce of another country at less than the normal value of the products," and permitted dumping duties only if such action caused "material injury" to a domestic industry.

Despite its long history, AD disputes were relatively few and far between until 1980. However, there is no exact accounting of worldwide AD activity before 1980. The main obstacle is that prior to 1980 the GATT did not require countries to report when they initiated AD actions. To our knowledge there is no source for pre-1980 filings (e.g., GATT Annual Reports or other similar documents). In fact, there is no guarantee that some early users have *any* record of their pre-1980 AD use.[2]

2.1. Pre-1980 AD Activity.

Despite the lack of comprehensive data on pre-1980 AD activity, there is consensus on several key points. First, it appears that almost all AD activity was confined to six major users: The US, the EU, Australia, Canada, South Africa and New Zealand. Second, these major users filed at most two or three-dozen cases (total) per year. Third, the GATT rules for imposing AD duties were difficult to satisfy. For instance, the US did not levy duties in a single AD case during the entire decade of the 1950s. The pattern during the 1960s was about the same when only about 10 percent of US AD cases resulted in duties. The high standards meant that there was very little AD protection among all contracting parties. In 1958, when the contracting

[1] The inclusion was not without controversy: the United Kingdom, for example, argued that the practice of dumping was not bad in itself and that the GATT should instead prohibit the imposition of antidumping duties. The United Kingdom's concern, shared by other participants, was that antidumping laws could compromise the overall objectives of the agreement to liberalize the international trading regime.

[2] Clearly, a comprehensive study of pre-1980 use is an open area of research, and one that would shed a great deal of light on the spread of AD protection. But, given that the data sources are only available at country-level (if at all), it is a research project that could probably only be tackled as part of a large-scale research program (e.g., WTO or World Bank sponsored project).

parties canvassed themselves about the use of AD, the resulting tally showed only 37 AD decrees in force across all GATT member countries, with 21 of these in South Africa (Finger, 1993). Simply put, until the mid-1970s it appears that in many years only a handful of cases were initiated worldwide, and in most years *no* investigations led to duties. The data we do have indicates that until the early 1970s less than 5 percent of AD cases resulted in duties.

Of course, it is now widely understood that an AD case can be "successful" even if it does not result in the imposition of duties. For instance, Prusa (1992) argues that withdrawn and terminated cases often involve voluntary export restraints. But the phenomenon of negotiated settlements was not common until the late 1970s. In addition, preliminary AD duties were not imposed until after the Tokyo Round, so the "investigation effect" emphasized by Staiger and Wolak (1994) is not likely a serious issue in the earlier era.

All things considered, the small number of AD filings (exact number unknown), along with the high standards for awarding protection, meant that AD had very little trade impact until the mid- to late-1970s.

2.2. Post-1980 AD Activity.

It is clear that the 1975-1979 period marked the end of AD's life in the backwater of trade policy. One of the things one must recognize when studying AD is that the law is constantly evolving. The type of behavior that is sanctionable changes over time.

The Tokyo Round, which concluded in 1979, contained numerous amendments to the AD statute. Of particular importance were two key provisions. First, the definition of "less than fair value" (LTFV) sales was broadened to capture not only price discrimination, but also sales below cost.[3] Cost-based allegations now account for between one-half and two-thirds of US AD cases (Clarida, 1996).[4] According to one noted legal expert, cost-based AD petitions have become "the dominant feature of US antidumping law" (Horlick, 1989, p. 136).[5] Second, the

[3] The rule codified recent practice in several of the signatory states, including Australia, Canada, and the United States.

[4] Different methods and definitions for evaluating Department of Commerce methodology explain the different estimates. Note also that the European Community, the other major user of AD, has similarly embraced cost-based methodology. Messerlin (1989) estimates that over 90 percent of EU cases against developing countries are based on constructed costs.

[5] Lindsey (1999) provides strong evidence for Horlick's view: over the four-year period 1995-98, only 4 of 141 LTFV calculations were based on a true price-to-price comparison.

Kennedy Round Code had required that the dumped imports be "demonstrably the principal cause of material injury" before duties could be imposed; In response to pressure from a number of the developed countries, the Tokyo Round Code revised this provision to render such a demonstration unnecessary.

These two amendments essentially changed the rules of the game. Almost as many cases were filed in the first three years following the Tokyo Round as during the entire decade of the 1970s. Overall, during the 1980s more than 1600 cases were filed worldwide -- a filing rate at least twice that of the 1970s.

From 1980 through 1985, four users (the US, the EU, Australia, and Canada) accounted for more than 99 percent of all filings (Finger, 1993). As the decade wore on, however, more and more cases began to be filed by "new" users. By the early 1990s new users accounted for almost one-quarter of AD cases and, by the mid-1990s, new users accounted for well over half of AD complaints. Miranda, Torres, and Ruiz (1998) break down the patterns of using and affected countries over the past decade.

In terms of numbers, the EU and the US continue to file the most AD cases. However, Finger, Ng, and Wangchuk (2000) argue that simply counting case filings is an inaccurate metric of AD use. In particular, they argue that the US and EU are the world's largest importers and, as a result, we should expect them to file more cases. As an alternative measure of the frequency of use of AD, they measure the number of cases per dollar of imports. Interestingly, by cases per dollar of imports, the US and EU have been among the least intense users over the 1995-1999 period.[6] Using this alternative metric, the most intense users of AD are developing countries (i.e., new users). For instance, Brazil's intensity of use is five times the US intensity, India's seven times, and South Africa and Argentina's twenty times the US figure. In fact, nearly all developed countries use AD more intensely than the US and EU.

The proclivity of AD use by developing countries has completely turned the table on the traditional proponents of AD, the US and EU. Traditional users are now more likely to defend themselves against AD allegations than they are to initiate actions. Over the past decade EU countries (as a group) have been the subject of more dumping complaints than any other country.

[6] This statement is conditional on being a user of antidumping. Countries such as Japan have never initiated an antidumping case.

The US increasingly finds itself subject to dumping charges as well, trailing only China and EU in alleged dumping activity.

Of course, we must reiterate that the increase in AD activity in no way means that there has been an increase in unfair trade or, in fact, that there has been any unfair trading at all. The ongoing tinkering with the AD statutes has weakened the law sufficiently that little real evidence of injurious dumping is required before duties are levied. As Patrick Low (1993) stated "virtually any industry that considers itself adversely affected by foreign competition and presents a competently assembled petition, stands a good chance demonstrating… that it is under attack (p. 86)."

Researchers argue that the growing number of AD disputes is due to a combination of (1) ongoing tariff liberalization, which simply leads to more trade and hence trade tensions, (2) unsatisfactory safeguard provisions which lead trade injured industries to avoid using them, and (3) increasingly weak AD standards (Hansen and Prusa, 1995; Miranda, Torres, and Ruiz, 1998; Finger, Ng, and Wangchuk, 2000).

2.3. Comparison of AD Rules Across Countries.

Each member state implements their national AD policies in accordance with the general guidelines specified by GATT/WTO AD code. The WTO guidelines, however, are quite vague, and it is up to each country's implementing legislation to interpret the guidelines. Not surprisingly, there is substantial variation among AD statutes, with each country insisting that its procedures are the "fairest." The following discussion offers a short summary of some key similarities and differences among the countries and is based on the detailed discussions in Jackson and Vermulst (1989), Steele (1996) and, to a lesser extent, GAO (1991) and Messerlin and Reed (1995).

- All AD users delegate AD investigations to special bureaucratic units; the extent to which these units are isolated from political pressure and independent of Executive authority varies across member states. We note, however, that even in those countries where the investigative agency is independent, it appears that cases often hinge on political pressure. This issue is discussed in detail in section 4.
- Jurisdiction of the two key determinations is either bifurcated or unified. Countries like the US and Canada authorize one agency to handle dumping determination and

another to handle the injury determination. The EU and Australia, on the other hand, have a single agency make both determinations. An argument in favor of the bifurcated approach is that the outcome is more likely objective since two mutually independent agencies must affirm the allegation. The unified approach, by contrast, minimizes resources and avoids conflicting judgments.[7] It is clear that either system will result in biased decision-making if the agencies are not independent of domestic industry pressure. This is an issue we discuss in detail in section 4.

- Transparency varies substantially across countries and seems to be a particular problem for new users. In particular, many new users do not provide explanation of their calculations and methods underlying their determinations.
- Confidential business information (e.g., firm-specific pricing and volume shipments, identity of purchasers, etc.) is almost always collected by the government agencies conducting the investigations; however, not all countries give interested parties access to this data. For instance, under EU and Australian law, only investigating authorities have access to all pertinent information; interested parties (e.g. the alleged dumper and its counsel) only get a summary description (Jackson and Vermulst, 1989). By contrast, under US and Canadian law, legal counsel (but not the parties themselves) have access to all confidential information.
- Price undertakings (i.e., agreements to revise prices in lieu of a formal judgments) are common in the EU and Australia, but less frequently used in the US and Canada.
- Most users require at least a preliminary injury determination before collecting AD duties, but many new users start collecting duties within a few days after the petition is accepted. Using US industry-level data, Staiger and Wolak (1994) show that the value of preliminary relief is sufficient to make filing a profitable strategy. That is, the fall in trade during the investigation period alone substantially benefits the domestic industry. Given that other countries are even more generous in granting temporary protection, their high propensity for filing cases in not entirely surprising.

[7] For instance, with two separate agencies involved, one agency can define the competitive products narrowly in order to maximize the duty and the other agency can define the relevant competition broadly in order to maximize employment and profit loss.

- Some countries, again most notably the US and Canada, mandate that the full AD duty be levied. Other countries, such as Australia and the EU, require that the AD duty be lower than the dumping margin if lesser duties would be sufficient to remove the injury caused by the dumping. The "full duty" rule means an affirmative dumping determination often leads to the complete cessation of imports from the subject countries.
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3. Pre-investigation issues.

3.1. AD petition filing.

In practice, AD cases begin only when an interested domestic party (typically a domestic firm or industry group of firms) files a petition, so a natural research issue is the determinants of who files for AD trade protection and when. The basic answer is the same as for any trade protection policy: It depends on the expected success of the petition, the expected benefit if successful, and the cost of the petition, including free-rider problems. However, the various features of AD law and its administration can often add a number of interesting details to this basic story. In addition, the volume of individual AD cases provides relatively a large sample of observations across time to examine these issues that may not be available for other forms of trade protection.

3.1.1. Industry-level determinants of AD petition filings.

A series of papers, including Finger (1981), Herander and Schwartz (1984), Feinberg and Hirsch (1989), Hansen (1990), Krupp (1994), Lichtenberg and Tan (1994), Furusawa and Prusa (1996), Blonigen (2000), and Sabry (2000), have estimated determinants of US AD filings by 3- or 4-digit SIC industry for a wide variety of time periods that fall between 1958 and 1992. All studies are single-equation, limited dependent variable specifications (such as probit, tobit, or Poisson) with the exception of Hansen (1990), which specifies a two-step nested logit model where the industry first decides whether to petition, and then the petition is either successful or not.[8] Despite these differences, there is general consistency in results across these numerous

[8] The advantage of Hansen's (1990) econometric specification is that she can and does show that the second-stage outcome decision affects the first-stage petition regression in a statistical significant manner.

studies. Three types of observable variables seem to be the primary determinants of AD petition filings (at least, for the US): Import penetration, domestic industry employment, and capital stock/intensity of the industry.

These findings accord well with the particular features of AD law and its administration in the US In the US, the dumping and injury determinations are decided by two separate agencies, the U.S, Department of Commerce (USDOC) and US International Trade Commission (USITC), respectively. The main hurdle is the injury test as the USITC rules affirmative in approximately 50 percent of the cases, while the USDOC almost always finds dumping. This implies that factors that affect the likelihood of a successful injury determination are most important, and import penetration and domestic industry employment (including changes in these variables) are observable variables used by the USITC for the injury determination.[9] Significant import penetration and employment are also likely to be proxying for the magnitude of benefits for a successful petition. Interestingly, domestic industry profitability and concentration do not seem to have much influence on petitions, though Feinberg and Hirsch (1989) find that more firms in an industry tend to lower the likelihood of petitions which supports the effects of free-rider problems.

A very recent focus in this area has been the additional consideration that domestic producers' export activity may also affect decisions to file AD petitions. Furusawa and Prusa (1996) consider a two-country model of reciprocal dumping where only one country has AD law. They find that firms in the AD country may not file AD petitions if market conditions are such that it leads to greater competition in the export market so that losses there more than offset the benefit of AD protection in their home market. Blonigen (2000) also considers a reciprocal dumping model, but allows both countries to have AD laws, so that retaliation is possible.[10] The model shows that if firms from both countries have sufficient exports to each others' market, a

[9] Interestingly, some studies (e.g., Furusawa and Prusa, 1996, Blonigen, 2000, and Sabry, 2000) find significant support that the level of import penetration positively affects petition activity, while other studies (e.g., Finger, 1981, Feinberg and Firsch, 1989, and Hansen, 1990) find evidence that changes in import penetration positively affect AD petition incidence. Finger (1981) is the only study that we have found that includes both the level and change in import penetration and the study finds that the level, and not the change, is a statistically significant determinant of AD petitions for the sample.

[10] Anderson, et. al. (1995) likewise considers a reciprocal dumping model where both countries may adopt AD laws. They examine the game where countries have the strategic choice over whether to adopt an AD law and find that an equilibrium where both countries adopt AD laws can lead to increased competition in both markets and actually benefit consumers.

cooperative outcome is possible, where no AD petitions are filed. Using data on US AD filing activity from 1980 through 1992, the paper finds larger export exposure dampens the incidence of US filings against some countries with AD activity over this period (Australia and New Zealand), but not others (the EU and Canada).

Prusa and Skeath (2000) examine worldwide AD activity to determine ways in which various countries' AD decisions are interdependent. They find that tit-for-tat, or retaliatory, behavior is evident in these patterns. Finally Bown (2000) demonstrates that the possible dampening effect the WTO dispute settlement mechanism may have on AD filings. These examinations of the interdependence of AD activity across countries are likely an important avenue of future research given the recent proliferation of countries adopting AD laws and the difficulties the WTO is facing in addressing this issue.

3.1.2. Macroeconomic effects on AD petition filings.

Changes in macroeconomic variables, such as exchange rates and GDP, can affect domestic and import variables used for determining government agencies' decisions in AD cases across all industries in an economy. To what extent government agencies should or do discount industry outcomes in their AD decisions when these outcomes are likely due to these macroeconomic shocks is an open question.[11] A few studies have examined the effect of macroeconomic variables on aggregate AD filing activity. Feinberg (1989) examines the effect of exchange rate movements on US AD filings across four import source countries (Brazil, Japan, Korea and Mexico) for 24 quarters from 1982 through 1987. The paper finds that a US dollar depreciation relative to the foreign currency leads to a significantly higher incidence of AD petitions, particularly with respect to Japan. The explanation is that a US dollar depreciation immediately lowers the price of the foreign firm's exports to the US in the foreign firm's own currency, which is the price used by the USDOC to determine dumping. Thus, if there is imperfect pass-through of exchange rates, or foreign firms are slow in adjusting prices, the chances of finding dumping and the magnitude of dumping rise.

[11] A related case in this regard is the escape clause petition by U.S. automakers in 1980, for which the USITC made an injury determination. A primary stated reason for the USITC negative decision was the determination that losses to U.S. automakers during the time period in question were due to the oil shock and resulting recession, not due to Japanese imports.

Knetter and Prusa (2000) revisit this issue and come to substantially different conclusions. They first develop a model that shows that exchange rates also affect the injury determination and, in fact, this effect moves in opposite direction from the effect of exchange rates on the dumping calculation. A US dollar depreciation decreases import penetration, ceteris paribus, making an injury determination less likely. Thus, the effect of exchange rates on AD outcomes and, hence, petitions should be ambiguous and depends on which decision, dumping or injury, is more important. Knetter and Prusa (2000) test this with a substantially larger sample, examining aggregate and bilateral AD filings for the US, Canada, EU and Australia from 1980 through 1998. In contrast to Feinberg (1989) they find overwhelming evidence that dollar *appreciations* lead to increased AD activity, which suggests that the injury determination is more important to the success of a petition. Knetter and Prusa (2000) also find that declines in real GDP also lead to increased AD activity, which is consistent with Leidy (1997) who uses a much smaller sample of US aggregate filings.

3.2. Effects from presence of AD trade protection.

One of the most important insights of the AD literature is that the mere presence of AD law can affect the behavior of firms and, hence, market outcomes, even if no AD duty is ever imposed. Papers in this literature show that this phenomenon can lead to a wide variety of outcomes, some obviously unintended and even perverse to the likely objectives of AD protection. A crucial feature of AD law that creates these incentives for strategic behavior on the part of firms is the use of established criteria based on prior market outcomes to make AD case determinations. This allows relevant firms to act strategically to influence AD outcomes. In other words, AD trade protection is endogenous with the firms' market decisions. Given the issue of strategic behavior to influence subsequent outcomes, these papers rely on models of imperfect competition (often, oligopoly models) in games of at least two stages, where the focus is on firms' first-stage choices of a strategic variable, such as price, quantity, or quality.

3.2.1. Non-cooperative outcomes.

One of the first papers in this literature, Leidy and Hoekman (1990), examines the production decisions of a single exporting firm with some degree of market power that faces possible AD protection against its exports and random exchange rate shocks. A key issue in the

paper, which will also be important for other papers discussed below, is how the AD authorities calculate the dumping margin. One method often used is the comparison between the prices set by an exporting firm, where the dumping margin is defined as the difference between the exporting firm's home price and its export price. Leidy and Hoekman (1990) call this "price-based AD law." A second alternative often used is a "cost-based" method where the dumping margin is the difference between a firm's (estimated) cost of production and its export price. Leidy and Hoekman (1990) show an important difference in the exporting firms optimal behavior to avoid an AD duty when having to adjust prices due to an adverse exchange rate shock. Under price-based AD law the firm can re-equalize prices after an exchange rate shock by both decreasing supply to raise prices in its export market and increasing supply (or dumping) to lower prices in its own home market, whereas, under cost-based AD law, adjustment must come from the supply to the export market only. Thus, relief to domestic producers in the export market from AD protection may be largest when AD authorities use cost-based methods.

Ethier and Fischer (1987), Fischer (1992) and Reitzes (1993) broaden the focus on strategic behavior by examining oligopoly games involving both a foreign and domestic firm. These papers examine two-stage duopoly games (both in prices and quantities), where firms compete in the first stage and a government authority imposes trade protection based on market outcomes in the second stage. The focus in these papers is on the first stage, where the firms strategically alter behavior to influence the second-stage AD outcome. Like Leidy and Hoekman, one result is that the foreign firm tries to lessen the chance of trade protection, but an additional insight is that the domestic firm will act to make trade protection more likely. Interestingly, and perhaps frustratingly, these incentive effects could lead to just about any combination of distorted market effects, depending on the characteristics of the strategic game being played by the firms.

For example, the actual market outcomes that occur based on these incentives differ significantly depending on whether the oligopoly game is in prices or quantities. Assuming a price-based method of determining the dumping margin, a domestic firm may increase output in a Cournot game to drive down the common price in the domestic market, while the foreign firm decreases its exports to the domestic market. This could actually improve welfare in the

domestic market if the net effect is greater competition.[12] Under price competition, however, the foreign firm alone determines its export price which is the basis for the dumping margin calculation. Thus, foreign firms may have incentives to raise price and, if the goods are imperfect substitutes, the domestic firm may then raise prices as well, which would hurt domestic welfare. We stress the word "may" in the previous sentences because, as Fischer (1992) shows, even these results may be reversed for various games of price or quantities, depending on other market conditions. In addition, a wider variety of outcomes occur if one considers a game in prices with perfectly substitutable goods, as in Reitzes (1993), or if one examines these games when the dumping margin is calculated using a cost-based approach, as analyzed by Fischer (1992).

An important omission of these papers is consideration of the injury determination in AD cases. Firms likely have incentives to not only manipulate the dumping margin, but also the injury determination. In fact, given the evidence on the effect of exchange rates on AD filings discussed above, the injury determination may be more important. Prusa (1994) and Pauwels, Vandenbussche, and Weverbergh (2001) examine this with respect to US and EU AD law, respectively. The additional insight from these papers is that the two considerations of dumping and injury may give the firms exactly opposite incentives to alter strategic variables. For example, while a domestic firm may want to increase output due to the dumping margin calculation in a game of quantities, they will have incentives to lower output to make an injury determination more likely.[13]

Given the ambiguous outcomes of possible market distortions by the presence of AD law, a number of papers have added important features to models based on relevant empirical information about the AD process that leads to more precise results. Kolev and Prusa (forthcoming, 2002) explore market distortions of cost-based AD laws under the realistic assumption that AD authorities have incomplete information on foreign firms' costs. Because of this incomplete information problem, Kolev and Prusa develop a game theoretic model where efficient foreign firms pool with less efficient foreign firms and voluntarily restrain their exports (i.e., a VER). This then leads the AD authorities to impose AD duties that are undesirably low

[12] Reitzes (1993) shows that this requires that the foreign firm's share of the domestic market needs to be sufficiently small.
[13] Leidy (1994) summarizes most of this early work.

(from the standpoint of the domestic producers) for efficient foreign firms and too high for inefficient foreign firms.

The interaction between VERs and AD protection and its effect on incentives of firms and governments was first explored in a sequence of papers by Anderson (1992; 1993). The literature above specifies the AD process in two stages. In the first stage, firms pick strategic variables that then impact the AD case outcome in a second stage. Based on the observation that many US AD investigations have led to VERs, Anderson adds an additional stage to this model of the AD process: The possibility of a negotiated VER after an AD case has been initiated. In practice, VERs are administered so that foreign firms receive the quota rents and these rents are based on the export shares of the foreign firms. These features lead to the possibility of a perverse market outcome called "domino dumping." In pursuit of quota rents from VERs based on export shares, foreign firms are encouraged by the trade protection policies to dump in order to start an AD investigation that will lead to a VER.[14] In a related paper, Rosendorff (1996) presents a model where AD investigations can provide a signal of a government's willingness to negotiate a VER with the foreign firms.

Blonigen and Ohno (1998) present another reason why the presence of AD law may actually encourage dumping on the part of foreign firms. They present an oligopoly model where foreign firms have different abilities to tariff jump AD protection in an export market. One possible outcome in the model is "protection-building trade" where a foreign firm dumps to elicit AD duties against all foreign firms in the industry[15], and then tariff jumps into a market that is protected against exports from other foreign rivals that do not tariff jump. They present a few US AD case studies which are suggestive of protection-building trade behavior.

While all the papers in this section examine how price or quantity decisions may be affected by the presence of AD law, Vandenbussche and Wauthy (2001) consider how firms' product quality choices may be affected. They analyze a model of vertical product differentiation between a domestic and foreign firm, where firms first choose quality and then prices. They show that if a price undertaking is the anticipated outcome from application of the

[14] We note that the timing of the AD case and VER in Anderson (1992, 1993) contrasts with the that in Kolev and Prusa (forthcoming). This is not necessarily inconsistent in that there is evidence in these papers from U.S. cases of the timing of the AD case and VER occurring in both possible sequences. In addition, a VER occurring before an AD case may not always be publicly announced or noticed.

EU AD law, the foreign firm will more aggressive in the quality game to have a higher quality than the domestic firm. The rationale is that price undertakings require the foreign firm to match the price of the domestic firm, which they will not be able to do and still compete in the market if they have the low quality product. Thus, AD law may reverse which firm "wins" the quality game and ultimately lead to lower welfare for the home country.

On a final note, given the nature of the issue, papers in this literature are almost exclusively theoretical. It is difficult to observe and measure how market outcomes are altered from the mere presence of AD law. One exception is an early paper by Herander and Schwartz (1984). The paper first estimates the probabilities of an AD filing and of an affirmative injury decision using data on US AD filings from 1976 through 1981. These probabilities are then specified as independent regressors in an equation explaining dumping margins over this period. The paper's hypothesis is that increased threats of AD duties (proxied by the two probabilities of case filing and injury determination) will lead foreign firms to alter their prices to avoid such an outcome and, hence, lower dumping margins. The paper finds mixed support for the hypothesis, which is likely due to a number of factors, including a limited time frame, insufficient methods to deal with endogeneity of the equations, and sample selection issues of focusing only on the pricing behavior of the firms that were involved in AD investigations. Nevertheless, the paper provides a useful insight into how empirical testing in this area may proceed in the future.

3.2.2. Cooperative (collusive) outcomes.

As Staiger and Wolak (1992) point out, a primary motivation for the origination of antidumping laws was to prevent foreign cartels from "dumping" their excess capacity into competitive markets and "unfairly" harming domestic producers. For example, Viner (1923) ascribes the 1916 US AD legislation as a reaction to the possibility of dumping by cartelized German steel producers. Staiger and Wolak (1992) examine a model where domestic competitive industry faces competition from a foreign monopolist, and the effect of AD law on market behavior. They show that dumping and, hence, AD activity is greater in periods of low foreign demand, which corresponds to this original rationale for AD laws. They also find that

[15] Blonigen and Ohno (1998) detail how the administration of AD law often lead to AD duties across many related import sources, not just the primary dumping sources.

the foreign firm will choose lower capacity with the AD laws in place, which means lower exports even in periods where there is no AD activity.

In contrast to Staiger and Wolak (1992), which provides a formal model for why foreign cartels may dump and why AD laws may effectively reduce this dumping behavior, a number of theoretical papers show how AD law can create cartel behavior by facilitating collusion among the domestic and foreign firms. Staiger and Wolak (1989) examines a market where the domestic and foreign firm are already tacitly colluding in an infinitely repeated game. The threat of AD acts as a mechanism to maintain the collusion, particularly when there are periods of low demand, which makes the tacit collusion more difficult to sustain.

In contrast, Prusa (1992) shows how AD law can lead to tacit collusion between the domestic and foreign firms when collusion does not exist in the first place. Prusa (1992) makes two important observations about US AD cases. First, once domestic firms are involved in AD cases, they may be exempt from antitrust actions through a US legal principle called the *Noerr-Pennington* doctrine. This exemption opens the door for private (collusive) settlements between domestic and foreign firms once an AD case has been initiated. The second observation follows from the first: There are a lot of withdrawn AD petitions in the US Between 1980 through 1985 about 38% of AD petitions were withdrawn; from 1980 to 1998 about 25% have been withdrawn. Prusa (1992) presents a bargaining model between a domestic and foreign firm competing in prices and shows that they will prefer settlements to AD duties and, hence, withdraw cases.

A shortcoming of Prusa's (1992) model is that it predicts there will always be a settlement. Panagariya and Gupta (1998), Gupta (1999) and Zanardi (2000) present models with additional considerations, such as incomplete information and negotiation costs, that predict that not all cases will be withdrawn. Zanardi (2000), which focuses on negotiation costs, also tests and finds evidence that domestic-side coordination costs and bargaining power affect the probability of withdrawal for US AD cases from 1980 through 1992 in ways that one would expect.

Finally, Veugelers and Vandenbussche (1999) examine the effect of AD law on a domestic cartel in the context of EU AD law. EU AD cases are about twice as likely to be resolved with price undertakings as US AD cases. They find that whether potential AD actions have a pro- or anti-competitive effect on the existing domestic cartel, depends on cost

asymmetries between the foreign and domestic firms and which agents in the domestic economy the AD authorities intend to help.

4. Issues Related to the Investigation.

4.1. Analysis of Factors Determining Injury.

According to GATT/WTO rules, there must be a determination of economic injury before AD duties can be levied. An ongoing research question is determining what factors drive the injury determination. Given the substantial data requirements to perform the analysis, the studies have focused entirely on EU and US decision-making.

Kaplan (1991) provides an excellent description of the USITC's decision-making process. Two key ideas emerge. First, agency discretion is paramount. Although Commissioners must look at statutorily defined factors, such as employment and the volume of imports, there is no precise formula for when material injury is by reason of dumped imports. Somewhat like the definition of pornography, they apparently know injury when they see it. Second, formal economic analysis is rarely done. "Trends analysis" is common, but this essentially means eyeballing charts and tables and confirming profits and employment are down. If imports have also increased, the causality connection is assumed. There appears to be no serious attempt to disentangle the injurious effects of dumped imports from other sources.[16]

Beginning with two seminal works, Finger, Hall, and Nelson's (1982) paper and Baldwin's (1985) book, a large literature has emerged testing the economic factors that determine injury. These two early studies deserve special recognition for framing the question and laying-out the institutional features and political economy dynamics of the administered protection process. All of the subsequent papers use the same general approach and estimate a decision function using binary regression techniques. In addition, given the substantial discretion the Commissioners have, most studies also test whether political pressure influences outcomes.

The research in this area can be distinguished by the disaggregation of the data, the number of cases included in the sample, and whether the Commissioner-specific votes are

[16] Pindyck and Rotemberg (1987) and Grossman (1986) develop methods for assessing whether imports have caused injury to a competing U.S. industry. Both approaches suggest that the USITC is far too willing to attribute injury to imports. There is no evidence, however, that either paper has had any impact on actual Commission practice.

analyzed. On the one hand, studies such as Anderson (1993), Moore (1992), DeVault (1993), and Baldwin and Steagall (1994) construct their samples using data from the case reports themselves. This means their data is very disaggregated, but they have a small number of observations, typically 50-60 separate cases. The drawback to this approach is that the USITC only provides data in the public reports when doing so will not release any confidential data and also when no participating firm objects. As a result, these papers have data on only about 20 percent of cases during the sample period under investigation. It also means that there is a potential sample selection problem, which results in the elimination of all cases concerning concentrated industries.

On the other hand, Finger, Hall, and Nelson (1982), Baldwin (1985), Hansen and Prusa (1996, 1997), Prusa (1998), Tharakan (1991), and Tharakan and Waelbroeck (1994a, 1994b) all use more aggregated data and are therefore able to construct much larger samples, typically 200-300 cases. The drawback to this approach, of course, is that the measures of economic injury are subject to measurement error due to the aggregation. For instance, the import surge motivating the affirmative injury determination may only have occurred for a couple of products (i.e., tariff line items), while the data used are some combination of 4- or 5-digit aggregated imports along with 4-digit SIC industry statistics. Moreover, this set of papers always focuses on cases involving manufacturing industries.

Despite the differing philosophies in constructing the data, the papers reach many of the same conclusions. The results can be summarized as follows. First, economic factors do influence outcomes. The studies that use more disaggregated data find a stronger connection between economic trends and outcomes than those using more aggregated data. Nevertheless, it is clear that the larger the volume of imports and the larger the profit (or output) loss, the greater chance of an affirmative decision.

Second, examination of US data has found that USITC Commissioners significantly differ in their voting behavior (Moore, 1992; DeVault, 1993; Baldwin and Steagall, 1994). These papers make it clear that getting the "right" person on the Commission clearly changes outcomes. No formal study has been done, however, on relating the previous background of the Commissioners to their voting records. This would be a valuable contribution to the literature, especially in light of the ample anecdotal evidence that suggests candidates with a free trade bias are not nominated for the Commission.

Third, political pressure matters – a lot. While the studies vary in what proxies they construct to measure political pressure, all find non-statutory factors are significant. For instance, two key House and Senate subcommittees control the USITC's budget. Moore (1992), DeVault (1993), and Hansen and Prusa (1996, 1997) all find that industries with production facilities in the districts of oversight members fare better at the Commission.[17] To put relative impact into perspective, Hansen and Prusa's estimates imply that an additional oversight representative increases the probability of success by about 8%. Hansen and Prusa (1996, 1997) also find that PAC contributions to the oversight members also improve an industry's chances, which suggests that political pressure is generated not just by employment concerns, but also by re-election financing concerns. Anderson (1993) is the sole exception, as he finds no measurable impact from his political pressure variables. He does not find political pressure affecting the USITC decisions, but this is almost surely because his proxies of political pressure are poorly constructed.

Fourth, political pressure can also take the form of bias against certain trading partners. Moore (1992) and Hansen and Prusa (1996, 1997) find that US cases against Western European countries are biased toward rejecting. By contrast, cases against Japan and non-market economies are far more likely to result in duties. Non-market economies fare particularly poorly at the USITC, a finding due in part to the fact that rules for non-market economies are particularly protectionist.

Fifth, the steel industry fares remarkably well. After controlling for industry size, employment, changes in profit, changes in trade volume, oversight representation, etc., study after study finds that US steel cases are about 30% more likely to receive protection that non-steel cases. This could be due to the fact that the steel industry files so many cases and has learned what arguments work better, or perhaps steel firms simply hire better legal counsel. The finding is also surely due to the numerous provisions the steel industry has managed to get incorporated into the AD statutes that apply to essentially steel alone.[18]

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[17] It should also be recognized that Commissioners have often previously served on the staff of these subcommittees, which suggests that the budget may not be the only channel that influence is felt.

[18] The captive production provision is an example. Under this rule, any steel produced and then sent downstream for further processing (e.g., coating) is not considered produced. Thus, if the domestic steel mills want measured output in a given category to fall they merely have to transfer product internally. In this case, imports could have nothing to do with a fall in measured output and everything to do with

Sixth, the "bifurcated" injury approach has a significant impact on the outcomes (DeVault 1993). Bifurcated injury means the USITC first determines whether there is injury and then determines the role of imports. This approach has the undesirable attribute that AD protection is only offered to industries with *negative* profits. Industries simply earning lower, but not negative profits, are not given protection. In related papers, Hansen and Prusa (1993) find that industries receiving protection continue to significantly under-perform. This suggests that industries that receive protection are under-performing for reasons other than imports. Yet, USITC practice is to reward precisely these industries.

Sixth, the same general lessons are revealed in EU cases: economics trends matter, country biases exist, and political pressure influences outcomes (Tharakan, 1991; Tharakan and Waelbroeck, 1994; Eymann and Schuknecht, 1996). In fact, Tharakan and Waelbroeck (1994) argue that the EU Commission is even more susceptible than the USITC to non-economic factors. They argue that this result follows from the EU's strict confidentiality rules where little information is revealed to parties. As a result, it is easier for political factors to influence the Commission's decisions since there is little formal accounting of the decision process. Eymann and Schuknecht (1996) argue, however, that over time the EU decisions have become somewhat less politically motivated while the US decisions have become somewhat more influenced by political pressure.

4.2. Cumulation and Increased Protection.

As mentioned earlier, the rules governing AD law are constantly evolving. In 1984, the US amended the AD statute mandating that the USITC cumulate imports across countries when determining injury. Without cumulation, imports are evaluated on a country-by-country basis. When cumulation is applied, the USITC aggregates all like products from all countries under investigation and assesses the combined impact on the domestic industry. In work related to the papers discussed above, Hansen and Prusa (1996) quantify the impact of this change in the statute. Using AD determinations between 1980 and 1988, they are able to identify the effect of cumulation by comparing outcomes before cumulation (1980-84) and after cumulation (1985-88). In the pre-cumulation period there were cases that would have been cumulated had the

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strategic product shifting. Once the dumping order is in place, the mills are free to stop sending their product downstream.

amendment been in effect. They find that the amendment had a dramatic effect on the USITC. After controlling for all other factors, they find that cumulated cases are about 30 percent more likely to result in duties than non-cumulated cases. In other words, their findings suggest that upwards of 50 percent of USITC affirmative determinations from 1985 through 1988 would have been negative without cumulation.

That cumulation raises the probability of an affirmative injury finding is not surprising. What is surprising is that they find that the cumulation effect is super-additive. That is, holding the volume of imports constant, the USITC is more likely to vote affirmatively if cumulation is involved. In other words, under cumulation, the domestic industry has a greater chance of receiving protection by filing against two countries each with 20 percent of the import market than against a single country with a 40 percent import market share.

Tharakan, Greenway, and Tharakan (1998) perform a similar "natural experiment" using EU data. They too find that cumulation increases the probability of levying duties and that it is super-additive. Moreover, Tharakan, Greenway, and Tharakan refine the Hansen and Prusa methodology and show that the super-additive finding is not simply due to having more countries involved in the investigation. Cumulation itself seems to have made the decision-makers more protective.

The reason for super-additive effect is an open question. Hansen and Prusa speculate that the USITC took the amendment as a signal from Congress to be more protective. Panagariya and Gupta (2000) offer the first formal explanation of the finding and base their explanation on free-riding. Panagariya and Gupta assume that the probability of injury increases in the import market share under investigation and decreases in the legal defense expenditures. The legal defense, provided by one foreign firm, automatically becomes available to all foreign firms subject to the investigation. This leads every foreign firm to invest less on defense than would be the case in a cooperative solution. Ceteris paribus, the larger the number of foreign firms charged, the more serious the free-rider problem. If a single larger foreign firm is named, it internalizes all the benefits of defense expenditures, and hence spends more to acquit itself.

4.3. Methods for determining dumping.

Most of the literature on US AD decisions has focused on the USITC's injury determination. One reason for this is that the USDOC almost always finds dumping. Over the

past decade, for example, the USDOC has issued only three negative LTFV determinations (out of almost 400 determinations). Boltuck and Litan (1991) offer a comprehensive study of the USDOC's LTFV procedures. The Boltuck and Litan volume clearly indicates that both statutory rules and also agency-level discretionary decisions serve the purpose of producing very large margins.

Moreover, the USDOC not only finds dumping, they almost always find unbelievably large dumping margins. Any argument that AD law is designed to ensure "fair trade" looks ridiculous when confronted with the USDOC's margins. According to the statute, the dumping duties are designed to make the dumped imports "fairly traded" imports. Yet, the average dumping margin over the past decade is about 60%. The extraordinarily large margins are even more onerous in light of the US's refusal to adopt a "lesser duty" provision. Murray (1991) and Palmeter (1991) suggest that the entire dumping margin process is an exercise in futility for the foreign firms. For essentially all foreign firms, the question is only whether the margin will completely foreclose them from the US market.

Finally, the USDOC has increasingly more frequently relied on "facts available" methods.[19] In about one-third of its calculations, the foreign firms have either refused to provide information or the USDOC ignored information provided by foreign parties. Baldwin and Moore (1991) find that the use of "facts available" nearly doubles the average US dumping margin from around 35% to over 65%.

Lindsey (1999) conclusively documents how the fair trade rhetoric stressed by AD's supporters has little to do with its practice. In a meticulous study, Lindsey reviewed every USDOC decision over a four-year period. He finds that in 97 percent of its calculations the USDOC uses methods that allow it to construct or estimate the foreign firm's costs or market price. Of course, constructed value methods are precisely when the USDOC can be more arbitrary. As feared, the dumping margins increase as the USDOC moves further away from evaluating actual market transactions. For his sample, the average dumping margin is 95% when "facts available" are used.

[19] This method was known as the "best information available" method prior to the Uruguay Round agreement.

4.4. Participating in the investigation.

AD law requires that the petition for relief must be on behalf of the entire domestic industry. In practice, this means that at least 50 percent of the domestic industry must not oppose the petition. However, domestic firms often oppose the petition. Although only a handful of petitions are rejected because of too much opposition, it seems a bit odd that domestic firms often do not support the petition. If reducing competition is possible, why not?

Cassing and To (1999) develop a model where informational asymmetries explain opposition. In their model, each firm's marginal cost is private information. By opposing the petition, low cost firms can signal their efficiency and gain at the expense of high cost domestic firms. For all domestic firms, the larger the imports, the greater are the benefits from protection. Combining the above two insights, Cassing and To show that if a firm opposes a petition when imports are large, it must be that it is quite efficient itself. They prove that the unique "refined" equilibrium involves low cost firms opposing the petition and high cost firms supporting the petition, assuming imports are sufficiently large.

Moore (2000) is also concerned with the decision to participate in the investigation. He studies why foreign firms often choose not to participate in the dumping margin calculation, and instead allow the case to proceed using "facts available," which always means very large tariffs. Moore argues that the foreign firm must trade-off the costs of participating in the USDOC investigation with the likelihood of receiving lower duties. He shows that even firms who are not dumping may nonetheless choose to not participate. In other words, not cooperating does not indicate guilt.

One concern with Moore's model is that he assumes that, if the foreign firm participates, the USDOC evaluates the firm's costs in a reasonable fashion. By this, we mean that the USDOC draws a realization of costs from the true distribution of costs. Given the papers by Murray (1991), Palmeter (1991) and Lindsey (1999), however, it is not clear that this assumption is consistent with USDOC methods. Nevertheless, this comment should not be taken as a serious criticism of Moore, but rather a call for more study of the issue of participation.

4.5. Designing optimal AD rules.

A serious problem with AD investigations is that the investigating agencies do not observe the foreign firm's true costs and prices. This is the issue addressed in the Kolev and

Prusa paper (forthcoming 2002) discussed above. Authorities also do not observe the domestic industry's true injury level. As a result, interested parties are likely to misrepresent the true information in the AD investigation. Kohler and Moore (1998, forthcoming 2001) apply optimal contract theory to the problem and propose alternative AD rules to account for the parties' incentives to misrepresent their private information.

Kohler and Moore (1998) consider the problem of designing an AD policy when the government does not have complete information about injury to the domestic industry. They show that if the government can only offer per-unit compensation schemes, then it is not possible to induce the domestic industry to truthfully reveal its injury level. However, if the government can offer a two-part tariff, they show it is possible to get truthful revelation of injury. This is a nice result because the remedy allowed under WTO rules is a duty levied per unit of imports, precisely the type of remedy that Kohler and Moore argue encourages the domestic firm to lie about its injury. The practical problem with Kohler and Moore's scheme is that it requires a payment to the domestic industry even if no injury is found --- a provision that would surely lead to even more filings.

Kohler and Moore (2001) take a more realistic tack by considering how an authority can audit information provided by the domestic firm to eliminate misrepresentation of injury. They show that the appropriate penalty size along with an optimal probability of auditing leads to truthful announcements by the firm, minimizes auditing costs, and discourages frivolous petitions.

5. Welfare effects and market outcomes of AD trade protection.

As with any trade protection policy, an obvious issue for economists is the welfare effects and market outcomes of the trade protection policy. Consistent with the theme throughout this chapter, there are special issues connected with AD trade protection that affect the analysis of these issues. In particular, the investigation process surrounding AD protection, as well as the administration and procedures for recalculating AD duties after the case, affect welfare and market outcomes to the point that the observable AD duties may be almost secondary in importance to the investigation and administration processes.

5.1. Welfare effects.

Welfare consequences of a standard *ad valorem* tariff are well known, particularly for the case of perfectly competitive markets. Domestic producers gain, but this comes at the expense of consumers and creation of deadweight losses. For a small country, the losses outweigh the gains, whereas a tariff by a large country may depress import prices enough to lead to net gains. Since AD trade protection involves an *ad valorem* duty, this analysis is generally applicable. However, as with our earlier discussions of other papers on AD, features of AD law and administration can add important layers of complexity to any starting framework.

5.1.1. Welfare effects for domestic producers.

A number of papers examining welfare effects of AD duties have focused on the benefits that accrue to domestic producers. Hartigan, Kamma, and Perry (1989) use a capital market event study methodology to examine whether non-steel US AD petitions in the early half of the 1980s led to positive abnormal stock returns for the petitioning firms. The paper generally finds statistically significant effects on petitioner's stock returns from affirmative AD decisions, but curiously finds that it is cases where the USITC ruled there was a threat of injury behind this result, not cases where actual injury was found. Unfortunately, the paper does not translate these statistically significant abnormal returns into dollar figures, so it is impossible to know the magnitude of the benefits to domestic producers implied by their estimates. Mahdavi and Bhagwati (1994) and Hughes, Lenway, and Rayburn (1997) use a similar approach to examine events surrounding the US trade dispute in semiconductors with Japan in the mid-1980s, including the AD cases that led to the Semiconductor Agreement. Neither study finds much impact from the AD investigation events, but significant positive abnormal returns for US firms from the Semiconductor Agreement.

Perhaps a more standard approach used by economists to estimate welfare effects is computable partial and general equilibrium models. Murray and Rousslang (1989), Morkre and Kelly (1994), DeVault (1996a) and Kelly and Morkre (1998) use computable partial equilibrium models to focus on the economic impact to the domestic industry implied by the dumping margin calculated for AD cases. The two papers by Kenneth Kelly and Morris Morkre examine all US AD and countervailing duty (CVD) cases from 1980 through 1988 for which they could obtain sufficient data from reports connected with the cases. They then examine each US AD (or CVD)

case individually with a computable partial equilibrium model to assess the implied revenue loss to the US domestic industry due to the dumping margin, which is calculated by the USDOC. They find that the revenue decrease (or "injury") to the domestic industry in the large majority of cases is quite small even for parameter estimates that would give an upper-bound estimate of this injury.

5.1.2. Overall welfare effects.

Since the calculated dumping margin becomes the *ad valorem* AD duty, a seemingly obvious implication of these partial equilibrium studies is that if dumping is not causing significant losses to the domestic industry, then the effects of the AD duty and, hence, overall welfare effects, are necessarily small. USITC (1995) and Gallaway et al. (1999) show that this implication is quite misleading. These two studies examine the aggregate welfare effects of all US AD and CVD orders in place as of 1993 using a computable general equilibrium model developed by economists at the USITC. A key insight that drastically affects the welfare analysis is that AD duties are not static over time. In a process known as an administrative review, the USDOC recalculates dumping margins as often as every year using the previous period pricing and/or cost data. As shown by DeVault (1996b), many foreign firms raise prices and then successfully lower dumping margins in administrative reviews to avoid the AD duty. Thus, by raising prices, foreign firms divert tariff revenue from the US government to their own revenue, not unlike switching from a domestic-held quota to a foreign-held quota. Gallaway et al. (1999) show in their model that the estimated welfare loss to the US economy from the *ad valorem* AD and CVD duties that one observes in 1993 is only $209 million annually. However, when one takes into account how much the AD duties fell over time from the administrative review process, the welfare loss ranges from $2-4 billion annually. This latter welfare estimate places AD and CVD trade protection as one of the costliest US trade protection programs.

Of course, these welfare estimates still may miss a number of very important considerations that affect welfare. First, given the discussion in section 3, there are likely substantial welfare affects occurring in markets for which we do not see any AD activity *per se*. Additional considerations below that are not included in these estimates include the effects of the investigation process itself, even for cases that do not lead to AD duties, and the possibility of subsequent tariff-jumping by foreign firms.

5.2. Other specific market outcomes.

5.2.1. Import and domestic output outcomes.

While the administrative process connected with AD trade protection affects overall welfare estimates, a number of empirical papers have also found significant impacts of the AD investigation process on other market outcomes. Staiger and Wolak (1994) investigate the effect of not only AD duties, but also various AD investigation events, on imports and domestic production for US AD cases from 1980 through 1985. Perhaps the most sophisticated econometric model used in the AD literature to date, the authors build a structural econometric model that aggregates information on AD actions that occur across very narrow import product codes into more standard industry level classifications. They then use this model to jointly estimate equations explaining AD filing, imports, and domestic output across all US manufacturing industries. Use of indicator variables that count the number of various investigation events ongoing across import product codes in an industry at a given time allows the paper to estimate effects on these imports and domestic production during various phases of the investigation and for the variety of possible AD case outcomes.

The evidence in Staiger and Wolak (1994) suggests a wide variety of import and domestic production effects that depend on the outcome of the investigation events. In particular, they find substantial import and output effects from preliminary affirmative, final affirmative and suspended decisions. The imposition of AD duties reduces imports about $50 million (from an initial average base of $291 million), with almost similar gains in domestic output (average initial base of $2167 million). Half of this change occurs at the preliminary affirmative decision and the other half at the final affirmative decision. A suspended case both reduces imports and increases domestic output by $25 million. Finally, the paper identifies two different filing strategies that imply substantially different effects on imports and domestic production during the investigation. An outcome filer is keenly interested in an affirmative final outcome and the trade-reducing impacts of the AD duty, whereas a process filer files in hopes that the petition itself will reduce imports. The paper finds most cases to follow an outcome filer process where imports do not decline unless and until a preliminary affirmative decision is made.

Krupp and Pollard (1996) also examine the effect of AD investigation events, as well as the final outcome, on imports. Unlike Staiger and Wolak (1994), they solve data aggregation issues by focusing on specific chemical product codes subject to US AD investigations from

1976 through 1988 for which they can get necessary disaggregated US production data. They also split their data into import sources named in the investigation and non-named import sources and examine the impact of the AD investigation and outcomes on both import sources. This allows the analysis of what is termed trade diversion, where trade protection against one import source in a product may divert demand toward other import sources for the product rather than the domestic producers. In about half of the cases, the paper finds evidence that the investigation process itself dampens imports from named import sources, and that the investigation and affirmative outcomes lead to increased imports from non-named import sources (i.e., trade diversion).

The issue of trade diversion is an important one because of its implications for who actually benefits from trade protection, and it is prominent in AD cases where petitioners often specify only particular import sources.[20] Prusa (1997) gathers detailed product-level trade data for all US AD cases that received final determinations from 1980 through 1988 and examines whether trade diversion effects generalize beyond just the chemical product cases examined by Krupp and Pollard (1996). With this comprehensive set of products, Prusa (1997) finds very substantial trade diversion effects. For all AD cases (whether there is a final affirmative decision or not), Prusa finds that the value of imports from non-named countries goes up approximately 20% the first year after the case and over 40% after five years. The trade diversion effects are higher for cases where high AD duties are imposed, but still substantial for low-duty cases and rejected cases. Thus, the evidence suggests that the benefits to domestic petitioners may be significantly offset by trade diversion. In contrast, Vandenbussche, Konings, and Springael (1999) examine trade data on all products subject to European AD investigations from 1985 through 1990 and find no evidence of trade diversion. These different trade diversion effects may be due to institutional differences in the AD investigation process between the US and the EU, and should be the subject of future analysis.

5.2.2. Price effects.

An immediate effect of an AD duty is to raise the price paid by consumers in the protected market. However, if markets are imperfectly competitive, there are a number of interesting

[20] This issue is obviously related to cumulation in the injury determination. Cumulation may make it easier to get affirmative decisions on a wider range of import sources to avoid trade diversion effects that would lessen the benefits to the domestic industry.

issues that influence how much prices rise and the responses of the other competitors in the market place.

5.2.2.1. Pass-through issues.

One of the first issues is the pass-through of the AD duty by the foreign firm onto consumer prices in the protected market. As with other issues discussed above, the administrative review process can have a substantial impact on pass-through of the AD duty. In the US, AD duties are assessed retrospectively. The initial AD duty is only an estimate, where the actual AD duty for a previous period is determined by recalculations during an administrative review and assessed *ex post*. This means that foreign firms may be able to avoid AD duties completely by appropriately altering their prices. Boltuck (1987) considers the case where the AD authorities calculate the dumping margin as the difference between the foreign firm's export price and its home price, and derives the market conditions that determine how much the foreign firm raises its export price and/or lowers its home price to decrease the AD duty.

Blonigen and Haynes (forthcoming) develops and tests two additional pass-through hypotheses. First, they show that because the USDOC uses the *ex factory* export price of the foreign firm (the price as the product leaves the factory), a firm wishing to eliminate an AD duty may have to allow up to 200% pass-through of the AD duty to the protected market consumers. Second, they show that the retrospective nature of the administrative review process structurally alters how firms allow exchange rate movements to pass-through to prices in the protected market. Using detailed product-level data on iron and steel products imported from Canada to the US before and after the 1992-93 US AD cases against these products, they find 160% pass-through of the AD duty onto US prices of Canadian steel and a substantial increase in exchange rate pass-through for these products after the case.

The pricing models in Boltuck (1987) and Blonigen and Haynes (forthcoming) are static. Blonigen and Park (2000) develop a model of dynamic pricing for a foreign firm that faces potential AD duties with recalculations through administrative reviews. When antidumping enforcement is uncertain, firms with *ex ante* expectations that the probability of AD enforcement is low, or that the probability of a settlement/VER (instead of AD duties) is high, will decrease their dumping and AD duties over time in the administrative review process once they face AD

duties. Using data on US AD duty changes over time from 1980 through 1991 they find evidence to support this hypothesis.

5.2.2.2. Pricing behavior of other competitors.

Given the number of theoretical papers suggesting that features of AD laws can facilitate collusive outcomes, there has been a paucity of empirical work to confirm this, particularly through exploration of price data. The one exception is Prusa (1997) which, as part of the analysis of trade diversion effects, examines unit values of products subject to US AD final determinations from 1980 through 1988 for both named and non-named sources. The paper finds that unit values of non-named import sources rise about two-thirds as much as the named import sources after an AD case, which may reflect the substitutability of products or, alternatively, may suggest some sort of collusive outcome.

5.2.3. Tariff-jumping FDI.

Above we discussed how trade diversion may occur in AD cases and lessen benefits to domestic producers. Another potential consequence of AD investigations and duties that may substantially lessen the benefits afforded the domestic industry is tariff-jumping by foreign firms. As shown by Haaland and Wooten (1998) and Vandenbussche, Veuglers, and Konings (1999), AD protection can induce foreign firms to locate in the protectionist country to avoid the tariff and actually make the domestic producers worse off from increased domestic competition.[21]

Empirical papers examining tariff-jumping of AD protection have mainly focused on the foreign direct investment (FDI) responses of Japanese firms using samples at different levels of disaggregation. The level of disaggregation is important because AD actions are often very narrowly targeted, which may make it difficult to identify its effects in more aggregate data. Barrell and Pain (1999) examine country-level Japanese FDI responses to AD activity in the US and the EU. Blonigen and Feenstra (1997) examine the interaction between trade policy measures (including AD protection) and Japanese FDI for the US from 1980-1988 using 4-digit

[21] Of course, there are other welfare consequences as well. Increased domestic competition would benefit consumers and the foreign firms are presumably worse off because they had implicitly chosen to export rather than FDI before the AD duty. World welfare could be worse as well, despite the increased competition in an imperfectly competitive market, if the foreign firm's production costs rise with the relocation.

SIC industry-level data. Belderbos (1998) and Belderbos and Sleuwaegen (1998), analyze tariff-jumping FDI of AD protection using a unique database of Japanese electronics firms and products. All these papers find significant tariff-jumping effects with respect to AD protection, and Blonigen and Feenstra (1997) even find that the threat of AD protection induces FDI.

One important policy issue with respect to tariff-jumping is the extent to which institutional differences in administration of the AD duties affect tariff-jumping incentives. In the EU, government officials often negotiate price arrangements between foreign and domestic firms, called "price undertakings," *in lieu* of AD duties. Veugelers, Vandenbussche, and Belderbos (1999) show that a strategic policymaker may prefer a price undertaking to an AD duty, in order to avoid tariff-jumping FDI. If this model is correct, one might expect there to be less tariff-jumping of EU AD duties than US AD duties, where there is no formal system for price undertakings.[22] Evidence in Belderbos (1998), however, finds that an affirmative AD decision raises the FDI probability from 19.6% to 71.8% in the EU, but only raises it from 19.7% to 35.95 in the US. Belderbos argues that the this difference is due to the fact that it is difficult for firms to lower AD duties after the case in the EU, whereas this is relatively easier to do in the US with the its retrospective administrative review process. Clearly, there is need for further research on this issue.

A final issue is whether the tariff-jumping responses found for Japanese firms characterize the responses of all firms. Blonigen (forthcoming) analyzes tariff-jumping responses of all firms subject to AD duties in the US from 1980 through 1990 and finds substantially smaller tariff-jumping responses for this sample. The results suggest that tariff-jumping FDI is only a realistic option for multinational firms from industrialized countries which comprise less than half the cases. This may be one reason why developing countries have been more concerned than industrialized countries about addressing AD protection in the WTO.

6. Conclusion and issues for future research.

Antidumping trade protection has a variety of unique features that set it apart from more traditional forms of trade policy. Virtually all trade economists realize that the effects of AD

[22] While the U.S. does not have a formal mechanism for price undertakings as the EU, private price arrangements may occur and lead to withdrawals of cases, as shown in Prusa (1992). In addition, the U.S. government has stepped in with other market arrangements, such as VERs, for high profile industries like steel and semiconductors.

actions are not summarized by the AD duty one observes. However, the AD literature to date has taken this general observation and established a whole set of results that shows that what one sees with AD trade protection is far from what one gets.

This is seen first in the substantial literature that shows the mere presence of AD law, with its established rules for determining outcomes, alters incentives for market participants. Thus, a wide variety of potentially distorted market outcomes has been discovered. This includes such perverse results as domestic industries feigning injury, macroeconomic factors driving petition activity, foreign firms possibly dumping *more* than they otherwise would (through either domino dumping or protection-building trade reasons), and the facilitation of market collusion that is apparently exempt from antitrust laws.

Second, the literature has shown that AD law on paper is not necessarily the same as AD law in practice. Virtually every study of AD outcomes in the US and EU has shown that political factors influence outcomes. In addition, the practice of using estimated cost data and/or "facts available" to determine dumping margins has become institutionalized and led to larger AD duties. Perhaps most importantly, AD law on paper has evolved over time to make AD trade protection ever more likely and effective. This includes the GATT Tokyo Round changes in AD law to broaden the definition of dumping to include sales below cost and to no longer require that imports be "demonstrably the principle cause of material injury." It also includes the 1984 US legislation to allow cumulation for injury determinations and the EU legislation to strengthen anti-circumvention provisions.

Third, investigation events have been shown to have effects on imports and domestic production that rival the AD duty itself. On the other hand, the investigation and AD duty can lead to other unintended market effects that can dilute the trade protection effectiveness, such as trade diversion and tariff-jumping FDI.

Fourth, and finally, the administration of AD duties *after* the cases has been shown by the literature to have substantial market and welfare effects that go beyond the observable AD duty. The literature has mainly focused on the retrospective administrative review process of the US, which has been shown to affect the pass-through of the AD duty and of exchange rates by the subject foreign firm. It has also been shown to lead to much more adverse welfare consequences for the US by allowing foreign firms to capture foreign rents at the expense of US tariff revenue.

6.1. Future research issues.

There are some big issues and questions that remain for the AD literature and a whole set of new questions that loom given recent developments in worldwide AD activity. We start with remaining questions in the existing literature.

Despite the statistics in section 2 detailing the substantial and growing use of AD laws, one question is why there aren't more AD filings. The literature has found many positive effects for domestic producers, including the ability to facilitate collusive outcomes with foreign rivals while avoiding antitrust consideration. It has also shown how much AD laws are tilted in favor of affirmative findings. It seems strange that we don't see many more AD petitions. Of course, there are effects that have been uncovered that could substantially mitigate the benefits that domestic producers receive. Trade diversion is one of those effects. Yet, the US cumulation legislation should allow petitioners to more easily prevent trade diversion. Tariff-jumping is another effect that can mitigate benefits to the domestic producers, yet Blonigen (forthcoming) finds that this is not a widespread phenomenon. Fear of retaliation is another possibility that has had little study. These explanations all assume that domestic firms are sufficiently aware of these laws to make informed choices about whether to file, which may be incorrect.

With the primary focus on domestic producers and market outcomes for the investigated product, there has been little study of effects for other agents affected by the AD law. Many, if not most, AD cases involve products that are important inputs into other sectors of the economy. Yet, with the exception of Feinberg and Kaplan (1993) and Hughes, Lenway and Rayburn (1997), there has been little study of the economic impacts to downstream sectors. Feinberg and Kaplan document how upstream AD protection spreads to downstream AD protection in US metal and chemical industries, presumably because the downstream sector became less competitive after its inputs became more costly. In contrast, Hughes, Lenway, and Rayburn find that US downstream industries benefited from the US Semiconductor Agreement with Japan, presumably because of the positive externalities between these downstream industries and a strong domestic presence in the upstream industry. Clearly, there is room to investigate these issues further.

There are other agents that are affected by AD protection as well. US AD law requires that AD duties be collected from the US importers, not the foreign firms. This must have impacts on the importing and distribution market that have so far been unexplored. Finally, there

has been little study of market effects on foreign firms' home markets in the subject product once they are subject to AD duties, even though the literature has uncovered a number of theoretical possibilities in this regard.

While there has been preliminary work to compare the effects of differing features of AD laws and practice between the US and EU system (mainly by European researchers), more needs to be done in this area. The two most substantial differences examined so far are the prevalence of price undertakings in the EU, and the US retrospective administration of AD review and duty collection versus the EU's prospective system. Price undertakings should lead to greater occurrence of collusion, but no one has examined this, much less even formally tested for collusion for any market with AD activity in either country.[23] These differences may affect which industries file for AD relief in the two countries, yet there has been no study to our knowledge that has examined who files in the EU, much less how this may differ from the US The US retrospective administrative review process has been shown to substantially affect market outcomes and welfare after the case, but much less is known about after-case market outcomes in the EU under a much different process.

A major reason why it is important to understand how these two systems yield different outcomes is because future WTO negotiations over AD laws will likely work toward further harmonization across countries. As the two major economies with active AD laws, the US and EU systems will be the basis for such a harmonization. However, without better information on the different economic impacts of these systems, economists will be less able to inform this upcoming process. And to this point, the evidence suggests that economists have been hardly heard by policymakers, as the evolution of the law has been to make it easier for domestic firms to gain AD trade protection.

Future WTO negotiations will also likely involve discussions on placing AD laws in the context of an overall competition policy. This is another issue that has had scant attention by economists to date.[24]

A final development that will require substantially more research attention is the growing proliferation of countries adopting and using AD laws. Researchers have just begun to document

[23] In related work, Messerlin (1990) found that industries that received AD protection had a surprising propensity to be investigated for anticompetitive practices, a result that suggests AD protection promotes collusion.

[24] Exceptions include Messerlin (1996), Prusa (1998) and Hartigan (2000).

this proliferation (see Miranda et al., 1998, and Prusa, 2000) and preliminary work has only started to looked at the interdependence of filings across countries (see Blonigen, 2000, and Prusa and Skeath, 2000). Will this proliferation in AD law adoption lead to greater AD activity and the possibility of a new round of tariff wars? Alternatively, will it possibly lead to less overall activity from some "cold war" outcome in the long-run and/or push the traditional users of AD laws into abandoning their stout defense of the necessity of AD laws in the next WTO round?

In summary, AD trade protection laws and activity continue to evolve and will be one of the more important future issues for the WTO and the world community. There are many open research questions that remain with current AD laws and activity, and new questions arising given recent events. Economists have established important conclusions about AD law and activity that are often not heard or ignored by policymakers. In order to have a voice in policy, research in this area will need to not only evolve as quickly at the AD policy, but also anticipate the future issues in that policy's evolution.

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