

# Antidumping, Signaling and Cheap Talk\*

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## Abstract

In the United States, there is evidence that domestic non-filing firms do not always support dumping/countervailing duty investigations. Absent other factors, domestic firms have an unambiguous incentive to support petitions filed by other domestic producers. We argue that in cases where the non-complainant firm is not a significant importer or exporter, the most plausible explanation is that non-support acts as a costly signal of private information. Extending the model to allow firms to engage in cheap talk, such signaling can take place even in the absence of an investigation. This result provides an explanation for the puzzling observation that fewer antidumping investigations are filed than one would expect.

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...at Weldbend we believe that the way to combat foreign competition is to invest in the most modern equipment, the most efficient production methods, and the most dedicated people in the world – and to treat the customer fairly. We have done all of these things, and that is why we can compete in the market. We do not need government help.

– James J. Coulas, Sr.  
President, Weldbend Corporation  
from March 9, 1994 response to  
ITC summons (U.S. I.T.C., 1995)

## 1 Introduction

Antidumping (AD) and countervailing duty (CVD) tariff protection cannot lower profits for firms in AD/CVD protected industries that neither import the affected commodity nor are vulnerable to foreign government retaliation. Rather, there is enormous upside potential for firms in some industries. Nonetheless, firms that would seemingly benefit from a successful antidumping or countervailing duty investigation do not always support it, opting instead for a “neutral” or “opposed” stand—that is, they do not support the petition. Moreover, in a recent survey, Blonigen and Prusa (2004) pose a second puzzle in that given the “many positive effects for domestic producers... It seems strange that we don’t see many more AD petitions.”

In the sections below, we begin with the first puzzle and propose an explanation based on signaling theory. In signaling models, firms have costly actions available by which they can distinguish themselves from their counterparts. In particular, we show that the puzzling act of opposing a petition can be used by a low-cost non-complainant as a credible signal to its rivals that it is in fact a low-cost firm. The signaling firm gains market share at the expense of losing the benefits of tariff protection. Indeed, it is exactly this costly loss of protection that makes the signal so credible. For example, in the case from which the introductory quotation comes, Weldbend Corporation *officially* opposed the petition despite being the largest US producer of “carbon steel butt-weld pipe fittings.” Officially opposing an antidumping petition is costly in that it reduces the likelihood of an affirmative determination. In fact, the US International Trade Commission

eventually concluded in this case that the foreign competition was not the cause of injury to the domestic competitors and so no industry protection was put in place.

In a similar vein, in the mid-1980s through the early 1990s, Nucor *publicly* voiced opposition to protection, emphasizing its own cost competitiveness (Iverson, 1986, 1993). And, in at least one case in the early 1990s, Nucor did back up its public posturing by publicly opposing the AD/CVD petition (U.S. I.T.C., 1993).<sup>1</sup> Yet, in other instances Nucor and others have postured opposition publicly but did not back up the opposition publicly. So what was Nucor doing with their public posturing in such instances? And, more generally, why do so few firms file for relief at all or so many withdraw their petitions?

To explain this second puzzle, we extend our basic signaling framework to allow firms to costlessly communicate prior to any decision to file a dumping petition. That is, a filing firm (or firms) can inquire of each of its rivals as to its intentions in the event that an antidumping petition is filed. Because this “cheap-talk” or “preplay communication” game is one of pure coordination, firms truthfully state their plan to support or oppose, with informational consequences identical to those of the signaling game. In other words, signaling effects may be quite prevalent even if there are very few antidumping cases where domestic noncomplainants publicly oppose the petition. Consequently, antidumping and countervailing duty laws can have profound impacts on the market even if domestic producers *never* file antidumping petitions.

The next Section presents some evidence of non-support. In Section 3 we set the institutional context with a brief overview of anti-dumping and countervailing duty procedures. Section 4 presents the model, derives the conditions for profit maximization when the cost structure of one of the firms is private information and establishes the conditions for the existence of a signaling equilibrium. Building on this framework, in Section 5 we allow firms to communicate prior to the filing of the petition. Finally, in Section 6, we offer some conclusions.

## 2 Evidence of Non-Support

Evidence of support and nonsupport of AD/CVD petitions can be found in the U.S. International Trade Commission’s Title VII investigation reports.

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<sup>1</sup>Nucor was involved in several cases in the early 90s but with the exception of the case cited, their stand was kept confidential in the publicly available report.

Table 1: Percentage rates of positions held by domestic producers in ITC antidumping and countervailing duty investigations.

Year	Support	Neutral	Oppose	Withheld	No response	No. cases
2000	56.3	1.0	0.0	42.5	0.3	39
2001	64.4	0.2	4.2	31.3	0.0	42
2002	70.4	0.2	1.5	26.6	1.3	68
2003	72.5	0.6	9.0	17.9	0.0	20

Average percentage of participants holding various stances for cases that proceed to final determination 2000–2003. Data on participant stances can usually be found in Section III of the ITC’s public Title VII reports. Cases for which there is no information have been omitted. Cases for which there is summary data on positions, the summary data have been used.

At the start of an injury investigation, “affected domestic producers” are each asked whether they support, oppose or take a neutral stance towards the investigation. Further, producers are asked if they would like their stance to be made public (U.S. I.T.C., 2004). The investigation report then lists each domestic producer’s stance as “support,” “opposed,” “neutral” or “withheld.” Supportive, neutral and opposed stances are self-explanatory but stances that have been withheld may be any of these. Below we argue that while some firms in opposition may also have an incentive to make their stance as public as possible when their goal is to send an unambiguous signal, for others if the signaling domestic producers believe a non-public signal is sufficiently clear (for reasons we elaborate on in Section 4) then they may well elect to keep their stance private in order to avoid labor hostility or other adverse reactions when opposed.

Looking at investigations completed between 2000 and 2003, Table 1 reports that public “opposed” and “neutral” stances were as high as 9.6% of all domestic participants in AD and CVD cases that proceeded to a final determination.<sup>2</sup> Although this is not insignificant and is supportive of the notion that non-complainants do at times oppose AD/CVD petitions, it is useful to consider the likely stances of participants that chose to keep their stances off of the public record—that is, at their request, non-complainant stances may be classified as “confidential business information.” Notice that the percentage of participants whose stances are withheld falls steadily

<sup>2</sup>The percentage of cases with at least one domestic firm opposing or holding a neutral stance ranges between 9.5% in 2001 and 38.2% in 2002.

from 42.5% in 2000 to 31.3% in 2001 to 17.9% in 2003. This steady decline can be linked directly to the passage of the Byrd Amendment in October of 2000, which awards “affected domestic producers” with a share of the antidumping and countervailing duty revenues collected. “Affected domestic producers” include petitioners and interested parties that are in support of the antidumping or countervailing duty investigation. In particular, in order to garner a share of the revenues collected, interested parties must not only support the investigation but must make their support public.<sup>3</sup> With such strong incentives for firms to make their support public information, it would be very surprising if there were not a large proportion of nonsupporters among those with stances withheld from the investigation reports. Thus the average incidence of nonsupport could be as high as 25–30% of all domestic producers.

As for our second puzzle, consider the paucity of AD/CVD investigations. The ITC calculated that the total value of imports investigated between 1980 and 2002 amounted to only \$55 billion or 0.4% of US imports (U.S. I.T.C., 2003). Blonigen and Prusa (2004) suggest that given the magnitude of the potential benefits, we ought to see more AD/CVD petitions. For example, Staiger and Wolak (1994) estimate that on average, the increase in domestic output from an affirmative final determination comes to about \$34 million. Moreover, the Department of Commerce almost always finds dumping and the International Trade Commission finds injury in about half the cases (Blonigen and Prusa, 2004) so that the rate of affirmative final determinations is relatively high. Yet, explicit rent-seeking costs relative to potential gains are notoriously low (Tullock, 1998). Supposing that total administrative and legal expenses are as high as \$1 million in a major dumping case, it should still be profitable, at least at the margin, for more industries to file AD/CVD petitions, but they don’t.

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<sup>3</sup>From the US ITC’s generic producers’ questionnaire (U.S. I.T.C., 2004):

... if the Commission’s final determination in the investigation is affirmative and an **antidumping and/or countervailing** duty order is issued, the Commission... will provide a list of firms supporting the petition to the Bureau of Customs and Border Protection for possible distribution of any antidumping and/or countervailing duties that may be collected. If you wish to waive business proprietary treatment of your response to this question in order to make your position with respect to the petition public and allow inclusion of your firm on that list, indicate “yes” below.

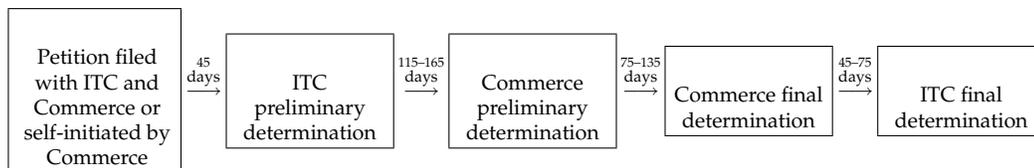


Figure 1: Statutory Timetables for Antidumping Investigations (280–420 days).

### 3 The Institutional Context

The GATT, as administered by the WTO, sanctions protective duties for industries that are confronted with “a product introduced into the commerce of another country at less than its normal value.” This includes both “dumping” and “subsidization.” If a firm or group of firms in an industry files a petition, an investigation begins. A positive finding depends on both finding a margin below fair value and making a determination of injury. In the United States, the Department of Commerce does the former and the International Trade Commission (ITC) the latter. Figure 1 lays out the timetable for these determinations.

The primary barrier to an affirmative ruling is the ITC’s injury test (for example, see Blonigen and Prusa, 2004). For this reason, we focus our attention on the injury determination phase of an antidumping investigation. Part I of Article VI of the GATT speaks to injury and the investigation. The investigators are required to consider “all relevant economic factors and indices having a bearing on the state of the industry” and determine that the unfairly priced imports are indeed the cause of injury to the domestic industry as opposed to the domestic competition of the petitioning firms. In particular, the investigators are admonished to consider “the degree of support for, or opposition to the application expressed by domestic producers of the like product, that the application has been made by or on the behalf of the domestic industry” (General Agreement on Tariffs and Trade, 1994). The wording of antidumping duty laws are quite explicit in the US, Canada and the EU, requiring that domestic supporters represent at least 50% of production for all domestic participants expressing an opinion and at least 25% of all domestic production simply to proceed to an investigation (U.S. Congress, 1930; Canadian Government, 1985; European Community, 1995). As an example of the importance of domestic support, in European cases between 1980 and 1986, negative injury determinations are most often the result of “lack of or insufficient cooperation from the domes-

tic industry” (Bellis, 1989). Thus, a failure to express support can be quite detrimental to a successful petition. This is recognized by the participants of the investigation. For example, in response to Weldbend’s non-support, the petitioning firms in the industry argued that Weldbend should be disqualified as a “related party” for fear that if included in the industry the chances of obtaining tariff protection would be reduced. The International Trade Commission nevertheless ruled that Weldbend was a related party (U.S. I.T.C., 1995, p. I-9, esp. footnotes 27 and 32).

In sum, although opposing an AD/CVD petition can significantly lower the probability of a positive finding with the attendant duty, firms do not always support them. This seems odd since there is little direct cost involved and firms could “jump on the bandwagon” to profit from antidumping action. Of course, it could be that some import-competing firms are also importers of related components or exporters that fear retaliation abroad.<sup>4</sup> But this was not so in the case cited above.<sup>5</sup> And as it happens, non-support is not so uncommon.

In the next section we will build on this institutional context by assuming that all parties are aware that non-support of the petition can be destructive to a positive finding with the attendant protection.

## 4 The Model

Consider a model of imperfect international competition with two domestic firms, 1 and 2, facing foreign competition for whom, for simplicity, output is fixed. Firm 2 files, or in later sections proposes to file, an AD/CVD petition. The structure of the precompetition game is as illustrated in Figure 2 (we will describe the specifics in more detail subsequently). In the first stage, nature determines whether firm 1 has high or low costs. Next, firm 1 decides whether or not to support the investigation,<sup>6</sup> based on its cost and on how it expects this decision will affect firm 2’s beliefs. The out-

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<sup>4</sup>For example, Blonigen and Brown (2003) find that industries with export exposure are less likely to file and Prusa and Skeath (2004) provide evidence of tit-for-tat retaliation to AD petitions.

<sup>5</sup>On the basis of the investigation record, the International Trade Commission found that Weldbend was not an importer or exporter of the product or the components of the product or affiliated in any way with a corporate entity that was involved in trading the product internationally (U.S. I.T.C., 1995).

<sup>6</sup>In reality, non-complainants can also take a neutral position (U.S. I.T.C., 2004). However, for simplicity, we restrict this to a binary choice with the interpretation that neutrality is equivalent to opposition.

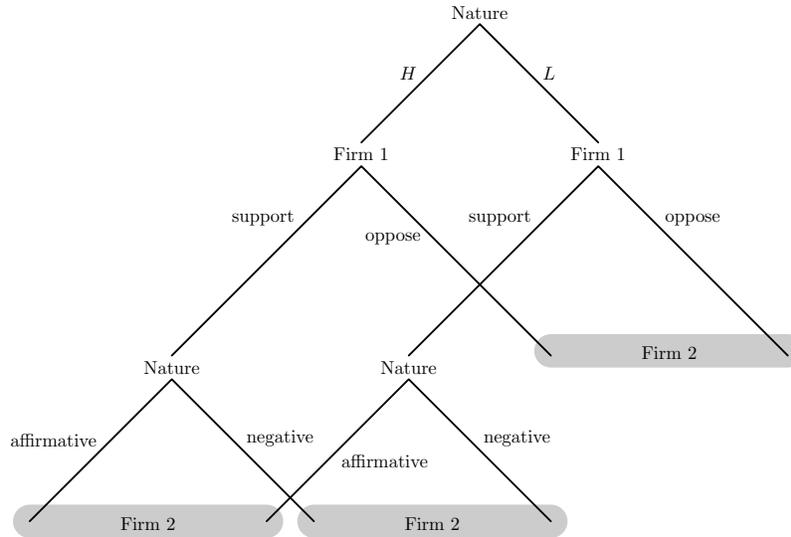


Figure 2: Pre-competition game tree

come of the investigation is then realized (conditional on firm 1's decision). Firm 2 then observes both firm 1's decision and Bayes updates its beliefs over firm 1's cost. The shaded ovals ("information sets") denote the fact firm 2 knows only that they are at one of the two points in the game tree but does not know with certainty which. That is, firm 2 knows the choice that firm 1 made and the outcome of the investigation but it is uncertain about firm 1's cost. Finally, given firm 2's updated beliefs and the outcome of the investigation, firms 1 and 2 compete in output.

Assume that firm 1's marginal cost,  $c_1$ , is known only to itself but for simplicity firm 2's marginal cost,  $c_2$ , is known with certainty.<sup>7</sup> The probability that firm 1 has low cost  $c_1 = c^L$  is  $\eta$  and the probability that firm 1 has high cost  $c_1 = c^H$  is  $1 - \eta$ , where  $c^H > c^L$ . Following any precompetition activities, firm 2 uses Bayes' rule whenever possible to update its beliefs.<sup>8</sup>

<sup>7</sup>We assume that the uncertainty is over firm 1's cost structure. However, the uncertainty can also be over other elements of firm 1's operations.

<sup>8</sup>For example, if both types of firm 1 always support the petition then firm 2 learns nothing from firm 1's choice but if high cost firm 1s support the petition while low cost firm 1s oppose then firm 2 perfectly infers firm 1's cost. On the other hand, when out-of-equilibrium actions are observed, Bayes' rule provides no guidance for updating beliefs. In such cases, equilibrium refinements (e.g., Cho and Kreps, 1987; Banks and Sobel, 1987) are often employed to determine the types of beliefs that are "reasonable."

Denote these updated beliefs  $\eta^* \in [0, 1]$ .

Let  $p(Q) = a - bQ$  be the domestic market inverse demand function where  $a, b > 0$ . Using the superscript  $t$  to denote firm 1's cost "type" which may be either low ( $L$ ) or high ( $H$ ), firm 1 profit is given by:

$$\pi^t = (p(q_1^t + q_2 + q_f) - c^t)q_1^t. \quad (1)$$

where  $q_1^t$  and  $q_2$  are firms 1 and 2's outputs and  $q_f$  is the level of foreign output. Similarly, given firm 2's updated beliefs  $\eta^*$  and denoting its profit by  $\Pi$ ,

$$\Pi = \eta^*(p(q_1^L + q_2 + q_f) - c_2)q_2 + (1 - \eta^*)(p(q_1^H + q_2 + q_f) - c_2)q_2 \quad (2)$$

Both firms maximize profits through their own choice of output.

Since an antidumping investigation is fraught with a "unique combination of political and economic manipulability, incentives, and intrigue" (Blonigen and Prusa, 2004), the final determination is far from certain. As such, we assume that the outcome of the investigation is randomly determined—the probability of an affirmative determination is conditional on firm 1's marginal cost and its decision over whether or not to be in favor of the petition. If firm 1 supports the petition then the probability of an affirmative determination is  $\gamma^L$  if firm 1 has cost  $c^L$  and  $\gamma^H$  if firm 1 has cost  $c^H$ —these probabilities are common knowledge. One of the requirements for an affirmative decision in a dumping investigation is that domestic firms should suffer injury due to dumping. Since higher cost firms are more likely to have been injured, the probability of an affirmative decision for a high cost firm should be greater than that of the low cost firm (i.e.,  $\gamma^H \geq \gamma^L$ ).

Furthermore, as discussed in Section 3, the GATT code explicitly instructs investigators to consider the degree of support for or against an investigation. In particular, to be on record as being in opposition to the petition, we assume, casts doubts on the merits of the case and therefore has a significant negative impact on the likelihood of an affirmative judgment. For simplicity we assume that if firm 1 opposes the petition then the probability of an affirmative determination is 0. In the event of a successful dumping investigation, we assume that remedial duties are sufficiently large to ensure that foreign imports are fully excluded (i.e.,  $q_f = 0$ ).<sup>9</sup> If the

<sup>9</sup>The complete exclusion of foreign imports following an affirmative determination is empirically quite plausible. For example, Blonigen (2006) estimates that dumping margins currently average more than 60%.

dumping investigation is unsuccessful, foreign imports are not excluded and  $q_f = q^* > 0$ .

The assumption that firm 1's support or opposition is observable to firm 2 is important and requires elaboration. In particular, at its discretion, a non-complainant's stance may be classified as *confidential business information*. Confidential business information is conveyed only to those with a "need to know." Petitioners and non-complainants themselves do not have a "need to know" and technically do not have access to this information. If the decision to oppose or support is unobservable then it cannot be used as a signal. However, those with a "need to know" include the staff working on the investigation, Commissioners and the counsel for the petitioners, respondents and other interested parties (U.S. I.T.C., 1998, §207.7(a)(3)). That is, although a non-complainant's stance is technically confidential, it is unrealistic to believe that its stance can remain hidden from rival firms since it is observed by the lawyers of the petitioners, respondents and non-complainant firms. In particular, it would be difficult to prosecute a private verbal statement by the counsel for  $X$  to the effect that " $Y$  opposed the petition." Even in the absence of unsanctioned private communication between counsel and client, it is natural to believe that for those directly involved in the case, the stances of non-complainant firms would become apparent—i.e., given their common objectives, one would expect that those in support of the petition would coordinate strategy and pool resources amongst themselves. In sum, there is significant doubt that non-complainant stances can be truly kept confidential between investigation participants so that non-complainant firms may take a particular position on an antidumping investigation, cognizant that their stance will be observed by all involved parties.

#### 4.1 Profit Maximization

Given the outcome of the dumping investigation,  $q_f$ , and firm 2's updated beliefs,  $\eta^*$ , firms 1 and 2 compete in output.

In an equilibrium of the second stage, firm 1 can condition its output on its marginal cost, so let  $q_1^L$  be the low cost firm's output and  $q_1^H$  be the high cost firm's output. A second stage Nash equilibrium is a triplet  $(q_1^L, q_1^H, q_2)$  such that i) given  $q_2$ , a type  $t$  firm 1's output,  $q_1^t$ , maximizes its profits and ii) given  $\eta^*$ ,  $q_1^L$  and  $q_1^H$ , firm 2's output,  $q_2$ , maximizes its profits. In other words, in equilibrium, if firm 1 is of type  $t$ , it chooses  $q_1^t$  as a best response to firm 2's output,  $q_2$ , and given its own updated beliefs ( $\eta^*$ ) over firm 1's

type, firm 2 chooses  $q_2$  as a best response to  $q_1^L$  and  $q_1^H$ . Before proceeding, define firm 2's expectation over firm 1's marginal cost:

$$\bar{c}(\eta^*) = \eta^* c^L + (1 - \eta^*) c^H.$$

Since  $c^H > c^L$ , this is strictly decreasing in  $\eta^*$ .

Firm 1's first order condition is:

$$\frac{\partial \pi^t}{\partial q_1^t} = a - 2bq_1^t - bq_2 - bq_f - c^t = 0$$

for  $t = L, H$ . Firm 2 is uncertain about firm 1's cost and must therefore maximize expected profits. It's first order condition is:

$$\frac{\partial \Pi}{\partial q_2} = a - 2bq_2 - b[\eta^* q_1^L + (1 - \eta^*) q_1^H] - bq_f - c_2 = 0$$

The equilibrium of the Cournot competition stage is the solution to this system of three linear equations. Solving yields equilibrium output and profits:

$$q_1^t(\eta^*, q_f) = \frac{2a - 3c^t - \bar{c}(\eta^*) + 2c_2 - 2bq_f}{6b} \quad (3)$$

$$q_2(\eta^*, q_f) = \frac{a - 2c_2 + \bar{c}(\eta^*) - bq_f}{3b} \quad (4)$$

$$\pi^t(\eta^*, q_f) = \frac{[2a - 3c^t - \bar{c}(\eta^*) + 2c_2 - 2bq_f]^2}{36b} = b(q_1^t)^2 \quad (5)$$

and

$$E\Pi(\eta^*, q_f) = \frac{[a - 2c_2 + \bar{c}(\eta^*) - bq_f]^2}{9b} = b(q_2)^2 \quad (6)$$

Note that, an increase in foreign output lowers profits for all domestic competitors so that, all else equal, firm 1, regardless of type, strictly prefers to support the dumping investigation. However, this is clouded by the incentive for firm 1 to manipulate firm 2's beliefs. In particular, firm 1's profits are strictly increasing in firm 2's belief that firm 1 has low costs. As we will see, these offsetting incentives, determine the outcome of the first stage where firm 1 decides whether or not to support the investigation.

## 4.2 The First Stage Equilibrium

Since firm 1 has private information, it can condition its choice to either support or oppose the investigation on its costs. Upon observing firm 1's

choice, firm 2 updates its beliefs over firm 1's type. In other words, firm 1 can use opposition to the petition as a costly signal of its type.

In signaling games with two types, there are two kinds of pure strategy equilibria: pooling or signaling (separating). A pooling equilibrium occurs when, regardless of its type, firm 1 either always supports or always opposes the dumping investigation. In a separating or *signaling* equilibrium, each type chooses a different action and as a result, their type is fully revealed. We focus our attention on the signaling equilibrium.<sup>10</sup>

**Proposition 1** *If  $\gamma^L$  is sufficiently small and  $\gamma^H$  and  $q^*$  are sufficiently large, there is a signaling equilibrium in the first stage where firm 1 opposes the petition when it has low costs and supports the petition when it has high costs.*<sup>11</sup>

**Proof:** If a low cost firm 1 always opposes the petition and a high cost firm 1 always supports it, firm 2 must believe that firm 1 is low cost ( $\eta^* = 1$ ) when firm 1 opposes the petition and high cost ( $\eta^* = 0$ ) when firm 1 supports it.

A low cost firm 1's payoff from opposing the petition is therefore  $\pi^L(1, q^*)$ . Firm 1 forgoes the potential benefits of the investigation ( $q_f = q^*$  with probability 1) but signals to firm 2 that it has low costs ( $\eta^* = 1$ ). On the other hand, should a low cost firm 1 deviate and support the petition, it would get an expected payoff of:

$$\gamma^L \pi^L(0, 0) + (1 - \gamma^L) \pi^L(0, q^*).$$

With probability  $\gamma^L$ , the investigation yields an affirmative determination, foreclosing foreign imports ( $q_f = 0$ ) and with probability  $1 - \gamma^L$ , the investigation yields a negative determination and foreign imports continue at their prior level ( $q_f = q^*$ ). But in supporting the petition, firm 2 believes that firm 1 has high costs with probability 1 ( $\eta^* = 0$ ).

A low cost firm 1 has no incentive to deviate from the signaling equilibrium as long as

$$\pi^L(1, q^*) \geq \gamma^L \pi^L(0, 0) + (1 - \gamma^L) \pi^L(0, q^*)$$

<sup>10</sup>The conditions under which the signaling equilibrium is the unique equilibrium that survives the Intuitive Criterion (Cho and Kreps, 1987) are qualitatively identical to those of our proposition. Indeed, if we make the extreme assumption that  $\gamma^L = 0$  and  $\gamma^H = 1$ , the unique (unrefined) Nash equilibrium of the first stage is the signaling equilibrium (we thank one of the referees for suggesting that we highlight this point).

<sup>11</sup>Notice from the proof of the Proposition that these conditions are satisfied as long as  $\pi^t(\eta^*, q^*)$  is increasing in  $\eta^*$  and decreasing in  $q^*$ . These comparative statics will hold for any demand function that satisfies the standard "strategic substitutes" assumption (i.e.,  $\partial^2 \pi^t / \partial q_1^t \partial q_2 < 0$ ).

or:

$$\pi^L(1, q^*) - \pi^L(0, q^*) \geq \gamma^L[\pi^L(0, 0) - \pi^L(0, q^*)].$$

The left-hand-side of this condition is the benefit to a low cost firm 1 to signaling. The right-hand-side is the potential benefit from a successful antidumping investigation to a low cost firm 1, should it choose to support the petition. In a signaling equilibrium, the former must be greater than or equal to the latter. Rearranging,  $\gamma^L \leq \bar{\gamma}^L(q^*) \equiv \frac{\pi^L(1, q^*) - \pi^L(0, q^*)}{\pi^L(0, 0) - \pi^L(0, q^*)}$ . Since  $\pi^L(\eta^*, q_f)$  is strictly increasing in  $\eta^*$  and decreasing in  $q_f$ ,  $\bar{\gamma}^L(q^*) > 0$  for any  $q^*$ .

A similar calculation shows that a high cost firm 1 has no incentive to deviate from the signaling equilibrium when:

$$\gamma^H[\pi^H(0, 0) - \pi^H(0, q^*)] \geq \pi^H(1, q^*) - \pi^H(0, q^*).$$

In this case, the benefit to signaling (pretending to be low cost) must be no greater than the potential benefit from a successful antidumping investigation. Again, rearranging,  $\gamma^H \geq \underline{\gamma}^H(q^*) \equiv \frac{\pi^H(1, q^*) - \pi^H(0, q^*)}{\pi^H(0, 0) - \pi^H(0, q^*)}$ . In this case,  $\underline{\gamma}^H(q^*) \leq 1$  only if  $\pi^H(0, 0) \geq \pi^H(1, q^*)$ . This holds provided that  $q^*$  is sufficiently large. ■

The intuition is as follows. When  $q^*$  is relatively large, the gains from antidumping relief are high and when  $\gamma^H$  is relatively large, an affirmative determination is likely thus relative to the benefit being thought to be low cost, it is in a high cost firm 1's interest to support the investigation. On the other hand, when  $\gamma^L$  is relatively small, the likelihood that a low cost firm 1 will benefit from antidumping relief is small so that the benefit from being perceived as low cost for the low cost firm 1 outweighs the potential gain from antidumping relief.

## 5 Preplay Communication

In the introduction, we provided evidence that domestic non-complainants often fail to support investigations and in Section 4 we argued that in many instances, the only plausible explanation is that firms oppose AD/CVD investigations as a means to signal their cost competitiveness. We now build on this framework to show that behavior that is consistent with our predictions can occur through other channels that are unobservable. To see how

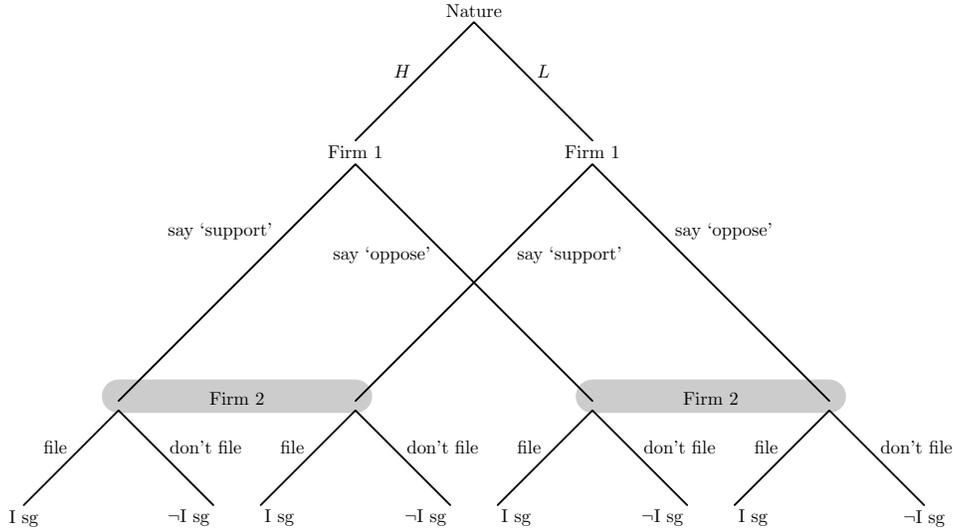


Figure 3: Preplay communication game tree

this can happen, consider an extension to the model where prior to the decision to file a petition, firms can costlessly communicate in an earlier stage. That is, we allow for cheap-talk<sup>12</sup> preceding the filing decision.

This extended game is depicted in Figure 3. As before, nature first determines whether firm 1 has high or low costs. Next, firms 1 and 2 can discuss their the possibility of filing an antidumping petition. Suppose that firm 2 is considering whether or not to file an antidumping petition. In particular, recognizing the impact of firm 1's stance on the likely outcome of the subsequent investigation, firm 2 has phoned firm 1 in order to gauge its position. Upon being approached by firm 2, firm 1 can state either "I plan to support the investigation" or "I plan to oppose the investigation."<sup>13</sup> After firm 2 observes firm 1's response it updates its beliefs over firm 1's cost. As before, the shaded ovals denote firm 2's inability to distinguish between whether firm 1 is high or low cost. Finally, firm 2 decides whether to file a dumping complaint. If firm 2 files the petition then play proceeds to the investigation stage from Figure 2 (denoted "I sg"). If firm 2 decides not to file a petition, then they compete given firm 2's beliefs at this stage (denoted "-I sg").

<sup>12</sup>See Farrell and Rabin (1996) for an overview of the literature on cheap-talk.

<sup>13</sup>In the following, these statements may be shortened to simply "support" or "oppose."

Now assume that participation in an investigation is costly so that if firm 2 files the petition, firms 1 and 2 incur positive (but possibly small) participation cost  $\varepsilon_1$  and  $\varepsilon_2$ .<sup>14</sup> Finally, assume that parameters are such that a signaling equilibrium exists and that  $\varepsilon_2$  is sufficiently small that in the absence of communication, firm 2 would always choose to file the petition.

As is typical in cheap-talk games, this extended game has multiple equilibria—a communication equilibrium and a “babbling” equilibrium. We focus on the communication equilibrium.<sup>15</sup> In a communication equilibrium, firm 1 truthfully reveals its intentions, stating “support” when it plans to support the petition and “oppose” when it plans to oppose it. Bayes consistent beliefs therefore have  $\eta^* = 1$  when firm 1 says “oppose” and  $\eta^* = 0$  when firm 1 says “support.” Since proceeding to an investigation is costly, when firm 2 observes “oppose” it rationally concludes that it should not file the petition. When firm 2 observes “support,” it knows that firm 1 will support its petition and rationally chooses to file the petition. Furthermore, since participation is costly, given firm 2’s equilibrium beliefs and behavior, firm 1 says “oppose” when it intends to oppose the petition and “support” when it intends to support it. In this equilibrium, the “signaling” simply moves to an earlier stage with identical but unobservable (to the researcher and the investigator) informational consequences.

**Proposition 2** *If there is a strict signaling equilibrium<sup>16</sup> for the AD/CVD investigation game and  $\varepsilon_1$  and  $\varepsilon_2$  are sufficiently small then communication is an equilibrium of the preplay communication game.*

**Proof:** Assume that if play proceeds to the AD/CVD investigation subgame then subsequent equilibrium play follows the signaling equilibrium and that this equilibrium is strict.

In the proposed equilibrium 1) when firm 1 states “support,” firm 2 believes that firm 1 is high cost ( $\eta^* = 0$ ) and as a result files an AD petition

<sup>14</sup>Since the International Trade Commission has subpoena power,(U.S. I.T.C., 2004) non-participation is not an option and firm 2 has the ability to unilaterally impose cost  $\varepsilon_1$  on firm 1.

<sup>15</sup>The communication equilibrium is the unique, reasonable equilibrium in the following sense. In order to avoid unnecessary participation costs, firms 1 and 2 have an incentive to coordinate their actions and file an antidumping petition only when it will be supported. That is, the underlying game is one of coordination. In this setting, the cheap talk refinement literature (Farrell, 1993; Matthews et al., 1991; Rabin, 1990) argues that communication is the only reasonable outcome.

<sup>16</sup>In a strict signaling equilibrium, a low cost firm 1 must strictly prefer opposing the investigation (i.e.,  $\gamma^L < \bar{\gamma}^L(q^*)$ ) and a high cost firm 1 must strictly prefer supporting the investigation (i.e.,  $\gamma^H > \underline{\gamma}^H(q^*)$ ).

and 2) when firm 1 states “oppose,” firm 2 believes that firm 1 is low cost ( $\eta^* = 1$ ) and as a result does not file an AD petition. If firm 1 states “support,” and depending on its cost type,  $t = L, H$ , it gets payoff

$$\gamma^t \pi^t(0, 0) + (1 - \gamma^t) \pi^t(0, q^*) - \varepsilon_1$$

and if firm 1 states “oppose” gets payoff

$$\pi^t(1, q^*).$$

In a strict signaling equilibrium  $\pi^L(1, q^*) > \gamma^L \pi^L(0, 0) + (1 - \gamma^L) \pi^L(0, q^*)$  so the payoff to “support” is strictly smaller than the payoff to “oppose” for  $t = L$  and a low cost firm 1 prefers to state “oppose.” Again, in a strict signaling equilibrium  $\pi^H(1, q^*) < \gamma^H \pi^H(0, 0) + (1 - \gamma^H) \pi^H(0, q^*)$  so when  $\varepsilon_1$  is sufficiently small, the payoff to “support” is greater than the payoff to “oppose” for  $t = H$  and firm 1 prefers to state “support.” Thus firm 1’s best response is to truthfully state its intentions, should an AD petition be filed.

On the other hand, consider the payoffs to firm 2’s choices when firm 1 states support. When firm 2 files a petition, it gets

$$\gamma^H E\Pi(0, 0) + (1 - \gamma^H) E\Pi(0, q^*) - \varepsilon_2$$

and when firm 2 does not file a petition it gets

$$E\Pi(0, q^*)$$

As long as  $\varepsilon_2$  is sufficiently small, the former is greater than the latter so when firm 1 states “support,” firm 2 prefers to file a petition. Now consider the payoffs to firm 2’s choices when firm 1 states “oppose.” When firm 2 files a petition, it gets

$$E\Pi(1, q^*) - \varepsilon_2$$

and when firm 2 does not file it gets

$$E\Pi(1, q^*)$$

The former is strictly less than the latter so when firm 1 states “oppose,” firm 2 strictly prefers to not file a petition. Thus firm 2’s best response is to file a petition if firm 1 states “support” and to not file a petition if firm 1 states “oppose.” ■

Since we have argued that firms would attempt to communicate prior to initiating an antidumping action, we need to reconcile the results of this extended game with the fact that non-complainants are sometimes observed

opposing antidumping petitions. There are a number of ways to do so; one is to weaken the assumption that in the face of opposition, the investigation surely fails. That is, firm 2's prior belief regarding the probability of an affirmative determination when firm 1 opposes the investigation should be non-zero. Provided the participation cost,  $\varepsilon_2$ , is sufficiently small, firm 2 will rationally choose to go forward with the investigation, even if firm 1 could credibly state that it plans to oppose it.<sup>17</sup> Since the petitioners plan to proceed regardless of firm 2's intentions, there are no longer common interests in coordinating. Thus, to ensure that any signal sent is credible, firm 2 must "put its money where its mouth is" and incur the cost of opposing the investigation. Returning to our introductory example, it seems unlikely that prior to filing their complaint, the petitioners did not first contact Weldbend, the most significant domestic producer. If the petitioners had contacted Weldbend prior to filing their petition then one must surmise that any statements made by Weldbend were dismissed since the petitioning firms intended to file the petition, regardless of Weldbend's statement of support or lack thereof. Once Weldbend's statement was dismissed, it had no choice but to wait for the investigation to send the costly signal of its type (i.e., opposing the petition).

To summarize, the possibility of unobserved preplay communication suggests that signaling behavior of the sort suggested by our model may be even more prevalent than the opposition to antidumping petitions we observe. This signaling can take place through "behind the scenes" communication, prior to the actual decision over whether or not to file the petition. Such backroom cheap talk can help explain why we observe so few antidumping cases—a noncomplainant's stated unwillingness to support a nascent petition may be sufficient to preempt the initiation of an investigation.

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<sup>17</sup>Suppose that when firm 1 opposes the investigation, the probability of an affirmative determination is  $\gamma^O \in (0, \gamma^L)$  regardless of firm 1's type. In this case, the conditions for a signaling equilibrium become:

$$\gamma^L < \bar{\gamma}^L(q^*) \equiv \frac{[\gamma^O \pi^L(1, 0) + (1 - \gamma^O) \pi^L(1, q^*)] - \pi^L(0, q^*)}{\pi^L(0, 0) - \pi^L(0, q^*)}$$

and

$$\gamma^H > \underline{\gamma}^H(q^*) \equiv \frac{[\gamma^O \pi^H(1, 0) + (1 - \gamma^O) \pi^H(1, q^*)] - \pi^H(0, q^*)}{\pi^H(0, 0) - \pi^H(0, q^*)}.$$

As in the proof of Proposition 1,  $\gamma^H(q^*) \leq 1$  if  $q^*$  is sufficiently large. In order for firm 2 to be willing to file a petition, even in the worst case (from firm 2's perspective) when firm 1 is low cost and plans to oppose, it must be that:  $\gamma^O E\Pi(1, 0) + (1 - \gamma^O) E\Pi(1, q^*) - \varepsilon_2 \geq E\Pi(1, q^*)$ . This is true as long as  $\gamma^O$  and  $\varepsilon_2$  are sufficiently small.

## 6 Conclusion

Firms in imperfectly competitive markets have an interest in signaling that they have a low cost structure so that they can increase market share and profits. But, of course, talk is cheap and so firms must be able to credibly demonstrate their competitiveness. If the firms are in an import-competing industry in which domestic competitors have filed a petition for protection from imports, not supporting the injury investigation suggests to the investigating agency that no protection is needed. Given the GATT rules on injury determination, this behavior will lower the probability of finding injury and so reduce the chances of tariff protection. At the same time, such a firm sends a credible signal that it is a low cost firm. Furthermore, because there may be unobservable communication prior to the decision to file, such signaling may occur even if firms are rarely observed opposing antidumping petitions.

Beyond this the model demonstrates yet another context whereby laws that aim to regulate trade can have economic consequences even when they do not appear to bind. For example, a negative finding in an anti-dumping case may appear to leave the competitive environment unaltered. But, as we have demonstrated, the investigation itself can provide the mechanism by which firms can send credible signals to the competition and change the competitive outcomes.

More generally, our model is applicable to any situation where firms can lobby for trade protection, production or investment subsidies, or even other forms of regulation, e.g., against stricter environmental standards. Whenever firms can lobby for some benefit, the basic result of our model is applicable. If nonsupport of such lobbying efforts has a negative impact on the likely outcome of lobbying efforts, then nonsupport can be used as a costly signal of strength.

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