# North-South trade, Antidumping and Information Asymmetry

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**Abstract:**

A northern firm produces an ethically sound good, while a southern firm produces a good with an ethically ambiguous status. The true status is known to the southern firm but not to consumers. The firms compete to satisfy the demand of the north. The northern firm introduces an antidumping complaint against the southern firm and launches an information (smear) campaign against it to influence local consumers' beliefs about the ethical character of the southern good. We show that the antidumping process and the smear campaign are complementary strategic tools for the northern firm.

JEL Classifications: F1, F12, F13, F16.

Key words: Antidumping, North-South Trade, Ethic, Information Asymmetry.

# 1. Introduction

With 784 anti-dumping investigations initiated against it between January 1995 – June 2010, China is by far the country most hit by this form of commercial retaliation (cf. WTO). A large portion of the complaints originate from developed countries (mainly the United States and the European Union). The cumulative number of antidumping, global safeguards, China-specific transitional safeguards and countervailing duties throughout the first three quarters of 2009 is 30.3% higher than the number of requests that took place in the first three quarters of 2008 (Bown 2009a). These measures add to the difficulties preventing the conclusion of the Doha round and to the tension of the recent economic crisis, also reminding us of the harshness of North to South trade relations which aren't ready to abate.

Article VI of the WTO stipulates that antidumping duties are authorized: members are allowed to set up a duty on a foreign product that is imported at below-market value and causes material injury to a domestic industry. This tariff is equal to the dumping margin. These policies seem to replace traditional trade policies (Blonigen and Prusa, 2003; Bown, 2009a, and Matschke and Schöttner, 2009). Among these policies, an antidumping duty is the preferred trade remedy of choice. The main problem linked to this antidumping rise includes the prominent risk of a new protectionism since it "allows considerable discretion over when and how to implement this policy" (Khatibi, 2009, Lindsey and Ikenson, 2003) and many studies show that article VI can often be used to find pricing below normal value (Blonigen, 2006).

In this context many articles stress that antidumping duties are used to pursue strategic trade policies (Cheng et al., 2001, Matschke and Schöttner, 2009, Staiger and Wolak, 1989 and Webb, 1992), given that they are most often applied in oligopolistic industries[i] and against certain countries (China mainly). These industries (like the steel industry, the pharmaceutical

industry or the textile industry) are well organized[ii] and are influential lobbies. The dumping margin is calculated thanks to an investigation initiated by the home firm affected by this unfair behaviour. This procedure seems to legitimise lobbyists' acts which tend to protect their sector (see Anderson, 1994; Moore and Suranovic, 1992, or Rosendorfi, 1996)[iii].

Moreover, the firm which is suspected of dumping has to cooperate in the investigations, but this cooperation implies some costs (the compliance costs described by Moore, 2005)[iv]. It can then lead to a paradoxical position in which the suspected dumping firm refuses to contribute to the investigations[v]. Nevertheless, this refusal could be expensive, as it leads to enforce the "facts available" rule. This rule allows the authority in charge of administrating the antidumping duty to tax the incriminated good, considering only the information provided by the home firm (Moore, 2005 and Tandfie, 2006; Bandyopadhyay, 2008, gives more details on the American antidumping procedure)[vi]. Firms may then be taxed where there is no dumping, or they can be excessively punished (Boltucck and Litan, 1991).

Here, one understands the central role of asymmetric information in antidumping procedures. In light of the literature on strategic trade policy and on political aspects of antidumping, this paper proposes introducing a new source of asymmetric information concerning the social quality of southern goods. The Code of ethics is difficult to observe since the producer is alone in knowing its ethical level. Then goods which are ethically differentiated are bought on trust as the consumer is subjected to strongly asymmetric information (Darby and Karni, 1973). If consumers are more aware of ethical concerns (i.e. to the social quality of goods), a negative information campaign against a southern firm could reduce the consumer confidence in the southern good. In this way it may discourage the foreign, discredited, firm from participating in the antidumping investigation. The more the foreign firm is discredited, the more it would be costly to recover the confidence of consumers and administration. As a

result, this information campaign would increase the efficiency of the antidumping procedure (i.e. higher antidumping tariff) because of the "facts available" rule.

In the current situation, an information campaign may influence the final level of the antidumping duty. China's products are, at the same time, the most frequent subject of new antidumping measures (see Bown, 2009b), and the most subject to negative information campaigns: defective Chinese tyres, tainted pet food, toothpaste manufactured with a toxic chemical and toys coated with lead paint, etc. Of course, this is not formal empirical evidence. No such evidence exists. If home firms engage in disinformation campaigns or smear campaigns against foreign firms, it would be by a much more hidden way and no empirical evidence could be easily found. However, theoretical work can show that a northern firm has interest in planning an (dis)information campaign about the dubious social quality of the southern firm's imported product in a context of asymmetric information for the consumer with ethical concerns. Combined with an antidumping procedure, it could be a gainful strategy. Thus, the growing ethical concerns in population may have the unexpected result of a recrudescence in antidumping procedures.

Therefore, we have constructed a North-South duopoly model, where the goods imported in the home (North) country from the foreign (South) country may be "ethically unsound". Like quality differentiation models (Mussa and Rosen, 1978), the demand side of the model consists of a continuum of consumers with a specific sensitivity to ethical concerns (Cardebat and Cassagnard, 2010).We show that an optimal antidumping duty exists, which enforces higher and higher tariffs as the uncertainty in its social quality of the good is high. The dumping margin depends on the sensitivity of the consumers to ethical concerns and on the uncertainty concerning the social quality of the imported southern good[vii]. One of the key

points of the strategic game comes from the decision of the southern firm choosing to cooperate or not with the antidumping procedure.

The remainder of the paper is organized as follows: The next section presents the theoretical framework and resolves the game to find the equilibrium outcomes. In section 3, we introduce the information campaign and we evaluate the effect of this tactic on the decision of the southern firm to collaborate in the investigations. The final section concludes this work.

## 2. Modelling Framework

*Timing of the Game*

We propose a three-stage game among an administering authority, a (northern) domestic firm, and a (southern) foreign firm:

- Firstly, the northern firm propagates information against the southern good[viii]. This campaign reduces the subjective probability that the good from the south is ethical. This campaign also allows the domestic firm to positively impact the level of antidumping duty. It is the "facts available" tariff. This tariff is imposed on the foreign firm if the domestic firm wins the petition and if the foreign firm refuses to cooperate.

- Secondly, the southern firm decides whether to cooperate with the antidumping petition or not.

- Thirdly, if the southern firm cooperates, a compliance cost $(K)$ is imposed by an administering authority with certainty and an antidumping duty $(t_A)$ is imposed with some positive probability $(1-\square)$. The compliance cost is associated with providing legal fees and the authority is assumed to care about both consumer welfare and domestic producer welfare. If the southern firm refuses to cooperate, then the duty $(t_F)$

is based on the domestic firm's allegations with some positive probability ($\mu$). We assume (like Moore 2005)[ix] $\gamma$ and $\mu$ are exogenous and that $\square \geq \mu$.

Both firms compete on price in order to satisfy the demand in the North. Their outputs are imperfect substitutes in the domestic market and are produced using constant marginal cost production technologies. They are distinguished by their code of ethics in production, according to Armington (1969), by place of production. We assume that imperfect substitution comes from ethical differentiation and that consumers are distinguished by their degree of ethical consideration.

**Figure 1: Extensive Form of the Game**
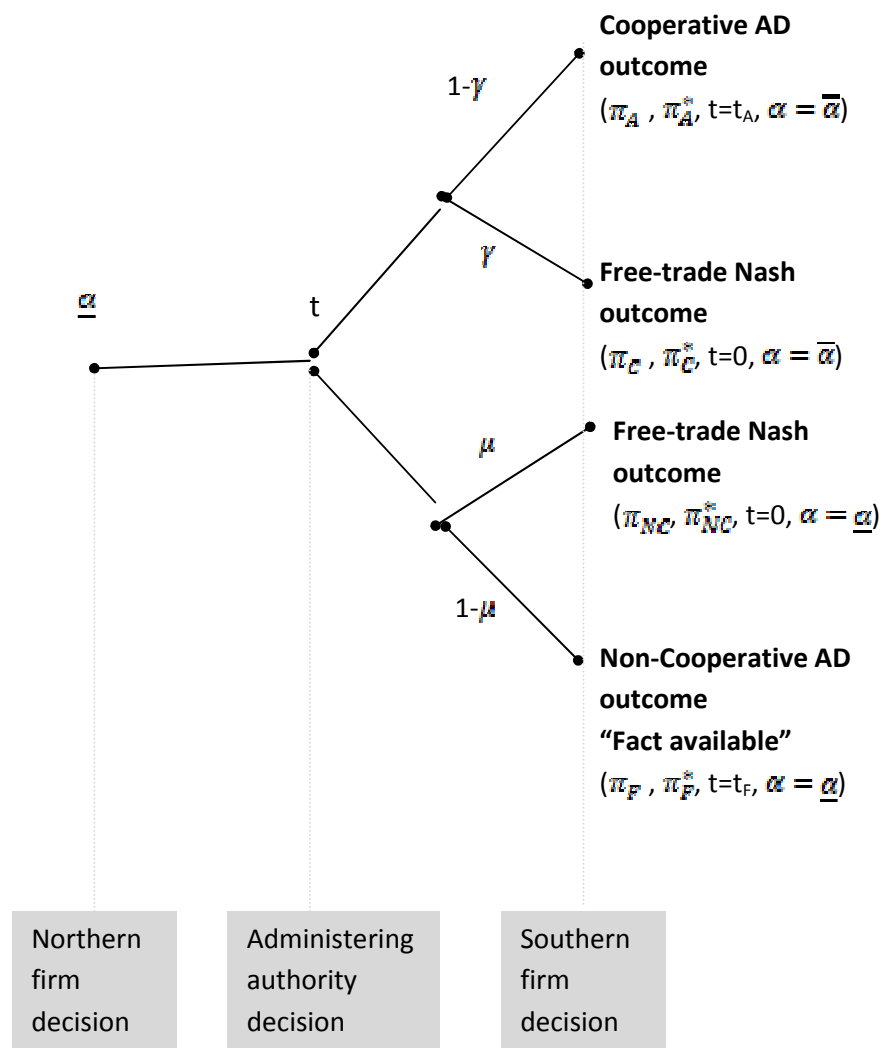
The model is solved by backward induction. The foreign firm will cooperate if the expected profits under cooperation are greater than under non-cooperation (Moore, 2005). Thanks to a negative campaign, the northern firm modifies the optimal antidumping duty ($t_F$), knowing the decision ruling of the foreign firm. On the one hand, if $t_F$ is too high, then the foreign firm will cooperate and the duty will be lower or perhaps equal to zero. On the other hand, if $t_F$ is set too low, then the foreign firm may prefer not to cooperate. The smear campaign permits the northern firm to bias $t_F$, knowing the compliance cost and consumer confidence in the foreign good. Figure 1 depicts this game by using its extensive form.

*Consumers Behaviours*

The following features of the model are standard in quality differentiation models. The demand side consists of a continuum of consumers $g \in ]0,1[$. Where g represents the consumer's sensitivity to ethical concerns: a low value means a low level of sensitivity to ethics and inversely for high values of $g$. One and only one consumer exists for every value of $g$ and each one buys at most one product.

Assume two levels of utility for the northern consumers: the utility of consuming a good produced by the northern firm (U) and the utility of consuming a good produced by the southern firm (U*).The utility of consuming the southern good is positively related to $g$ and $\propto \in [0,1]$ ; α is the ethical differentiation parameter, it represents the consumer confidence in the southern good. Then α can be interpreted as the subjective probability (from the consumer's point of view) the southern good sounds ethically. Let us finally consider an exogenous ethical level ($\varepsilon > 0$) which represents the social quality of the good. *u* is an exogenous positive constant.

P* is the price of the southern product and P is the price of the northern product; these prices are such that P > P*. Starred letters refer to southern variables. Assume that the northern good is systematically sound ethically whereas the southern one is unsound ethically: as for the consumers, southern goods are always less ethical than the northern ones. The difference between the utilities and the price of the corresponding good gives two consumer surplus (CS* and CS):

$$
\begin{aligned}
CS^* &= U^* - P^* = u + g\alpha\varepsilon - P^* \\
CS &= U - P = u + g\varepsilon - P
\end{aligned}
$$
(1)

$\tilde{g}$ is the marginal consumer who is indifferent to consuming the southern good and consuming the northern one.

$$
CS^* = CS \Leftrightarrow \tilde{g} = \frac{P - P^*}{\varepsilon(1-\alpha)}
$$
(2)

Then the following condition must be satisfied in order for the marginal consumer to fall in the feasible range [0,1].

Condition: $\tilde{g} \in [0,1] \Leftrightarrow P - P^* \leq \varepsilon(1-\alpha)$

We then obtain the demands addressed to the firms. To simplify the model, we assume there is no marginal consumer who is indifferent between consuming the southern good and not consuming this good: $D^* = \tilde{g}$ and $D = 1 - \tilde{g}$

*Producers Behaviour*

What follows describes the profits of the southern firm ($\Pi^*$) and the northern firm ($\Pi$).

$$\pi^* = (P^* - (c+t))D^*$$
$$\pi = (P-1)D \tag{3}$$

We assume that $c < 1$, is the marginal cost of production of the southern firm. The marginal cost in the north is normalized to 1. $t$, is the antidumping duty set by the administering authority. In the last stage, each firm chooses the prices in order to maximize its profit. Thus, Nash equilibrium prices with an antidumping duty and the non-cooperation of the southern firm in the antidumping investigations are:

$$P_F^* = \frac{1 + 2(c + t_F) + \varepsilon(1 - \underline{\alpha})}{3}$$
$$P_F = \frac{2 + c + t_F + 2\varepsilon(1 - \underline{\alpha})}{3} \tag{4 and 5}$$

In this case, the tariff $t_F$ is the "facts available" duty implemented by the authority. We assume that the non-cooperation induces a lower consumer confidence ($\underline{\alpha} < \alpha$) because the northern firm engages a negative information campaign which reduces this confidence to obtain the highest antidumping duty.

If the southern firm accepts a cooperation then Nash equilibrium prices are:

$$P_A^* = \frac{1 + 2(c + t_A) + \varepsilon(1 - \overline{\alpha})}{3}$$
$$P_A = \frac{2 + c + t_A + 2\varepsilon(1 - \overline{\alpha})}{3} \tag{6 and 7}$$

We assume that this cooperation increases the confidence of the northern consumer with respect to $\underline{\alpha}$. The antidumping duty $t_A$ implemented in this case is calculated in the next subsection. In addition there are two price pairs under free trade. As before, the cooperation implies a higher confidence ($\overline{\alpha} > \underline{\alpha}$) whereas the non-cooperation implies a lower confidence ($\underline{\alpha}$); under cooperation the Nash equilibrium prices are:

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$$P_C^* = \frac{1 + 2c + \varepsilon(1 - \overline{\alpha})}{3}$$

$$P_C = \frac{2 + c + 2\varepsilon(1 - \overline{\alpha})}{3}$$

(8)

And under non-cooperation we have:

$$P_{NC}^* = \frac{1 + 2c + \varepsilon(1 - \underline{\alpha})}{3}$$

$$P_{NC} = \frac{2 + c + 2\varepsilon(1 - \underline{\alpha})}{3}$$

(9)

Higher differentiation decreases the southern price and reduces the competition between ~~the~~ both firms. From these equilibrium prices we can easily calculate the other equilibrium values.

*The market equilibrium*

The cooperative demands with the antidumping duty $t_A$ are:

$$D_A^* = \frac{1}{3} + \frac{1 - (c + t_A)}{3\varepsilon(1 - \overline{\alpha})} = \frac{1 - (c + t_A) + \varepsilon(1 - \overline{\alpha})}{3\varepsilon(1 - \overline{\alpha})}$$

$$D_A = \frac{2}{3} - \frac{1 - (c + t_A)}{3\varepsilon(1 - \overline{\alpha})} = \frac{-1 + (c + t_A) + 2\varepsilon(1 - \overline{\alpha})}{3\varepsilon(1 - \overline{\alpha})}$$

(10) and (11)

Higher differentiation decreases the demand which is addressed to the southern firm because higher differentiation implies lower consumer confidence. $t_A$ raises the import price good and decreases its demand. The demands under free trade and cooperation are:

$$D_C^* = \frac{1-c+\varepsilon(1-\overline{\alpha})}{3\varepsilon(1-\overline{\alpha})}$$

$$D_C = \frac{-1+c+2\varepsilon(1-\overline{\alpha})}{3\varepsilon(1-\overline{\alpha})}.$$

(12) and (13)

The non-cooperative demands with the antidumping duty $t_F$ are:

$$D_F^* = \frac{1-(c+t_F)+\varepsilon(1-\underline{\alpha})}{3\varepsilon(1-\overline{\alpha})}$$

$$D_F = \frac{-1+(c+t_F)+2\varepsilon(1-\underline{\alpha})}{3\varepsilon(1-\underline{\alpha})}.$$

(14) and (15)

In this case but under free trade we have:

$$D_{NC}^* = \frac{1-c+\varepsilon(1-\underline{\alpha})}{3\varepsilon(1-\overline{\alpha})}$$

$$D_{NC} = \frac{-1+c+2\varepsilon(1-\underline{\alpha})}{3\varepsilon(1-\underline{\alpha})}.$$

(16) and (17)

The following table brings together the consumer's surplus in each case.

**Table 1: Consumer's surplus at the equilibrium**

|  | Outcome (Probability) | Domestic consumer's surplus | Foreign consumer's surplus |
|---|---|---|---|
| Foreign Firm | Free Trade ( $\gamma$ ) | $\frac{3\overline{\alpha}-2}{2}\varepsilon D_C^2 - (u+\overline{\alpha}\varepsilon+3)D_C$ | $(u-t_A)D_C^* + D_C^{*2}\varepsilon\frac{3\overline{\alpha}-2}{2}$ |
| Cooperation | antidumping (1- $\gamma$ ) | $\frac{3\overline{\alpha}-2}{2}\varepsilon D_A^2 - (u+\overline{\alpha}\varepsilon+3)D_A$ | $(u-t_A)D_A^* + D_A^{*2}\varepsilon\frac{3\overline{\alpha}-2}{2}$ |
| Foreign Firm | Free Trade ( $\mu$ ) | $\frac{3\underline{\alpha}-2}{2}\varepsilon D_{NC}^2 - (u+\underline{\alpha}\varepsilon+3)D_{NC}$ | $(u-t_{NC})D_{NC}^* + D_{NC}^{*2}\varepsilon\frac{3\underline{\alpha}-2}{2}$ |
| Non Cooperation | antidumping (1- $\mu$ ) | $\frac{3\underline{\alpha}-2}{2}\varepsilon D_F^2 - (u+\underline{\alpha}\varepsilon+3)D_F$ | $(u-t_F)D_F^* + D_F^{*2}\varepsilon\frac{3\underline{\alpha}-2}{2}$ |

*Global Welfare and Optimal Tariff*

As with the strategic trade policy literature, we assume that the trade authority cares about both consumer and domestic producer welfare (W):

$$W = CS + CS* + \Pi + t \cdot D*$$

$$W = \frac{1}{6}\left[\frac{(1-c)^2 - t^2}{\varepsilon(1-\alpha)} + \varepsilon(2+\alpha) + 6(u-1) + 2t\right] \qquad (18)$$

$$\frac{\partial W}{\partial t} = 0 \Leftrightarrow \hat{t}_{F1} = \varepsilon(1-\underline{\alpha}) \text{ or } \hat{t}_{A1} = \varepsilon(1-\overline{\alpha}) \quad {}^{2}$$

$\hat{t}_F$ and $\hat{t}_A$ are the optimal antidumping duties if the authority also cares about the consumers[x]. They are positively related to $\varepsilon$ and negatively related to $\alpha$.

**Proposition 1**: *If the administering authority in charge of setting an antidumping procedure cares about both consumer and domestic producer welfare, then the optimal antidumping duty ($\hat{t}$) is positively related to the level of ethics required in the north ($\varepsilon$) and negatively related to the consumer confidence ($\alpha$) such as $\hat{t} = \varepsilon(1-\alpha)$*

## 3. "Facts Available" and Information Campaign

*The southern firm decision*

The foreign cost of production and ethical considerations are privately held information of the exporter, consequently the southern firm needs an incentive to cooperate in the investigation. Moore (2005) explains that this incentive depends on the potential use of the facts available

method: the northern firm will probably overstate the dumping margin thus the southern one would face high duty if it refuses to cooperate and lower consumer confidence. On the one hand, cooperation allows the southern firm to improve confidence of the northern consumers, but it implies for the southern firm an additional cost of cooperation. Like Moore (2005) we assume that if the southern firm cooperates with the investigation, it incurs constant compliance costs ($K$). On the other hand, the "facts available" rule increases the dumping margin and reduces the consumer confidence in the southern good. The following table brings together the profits at the point of equilibrium[xi].

**Table 2: Profits at the equilibrium**

|  | Outcome (Probability) | Domestic Profit | Foreign Profit |
|---|---|---|---|
| Foreign Firm | Free Trade ($\gamma$) | $\pi_C = \frac{[2\varepsilon(1-\bar{\alpha})-1+c]^2}{9\varepsilon(1-\bar{\alpha})}$ | $\pi_C^* = \frac{[\varepsilon(1-\bar{\alpha})+1-c]^2}{9\varepsilon(1-\bar{\alpha})} - K$ |
| Cooperation | antidumping (1- $\gamma$) | $\pi_A = \frac{[3\varepsilon(1-\bar{\alpha})-(1-c)]^2}{9\varepsilon(1-\bar{\alpha})}$ | $\pi_A^* = \frac{(1-c)^2}{9\varepsilon(1-\bar{\alpha})} - K$ |
| Foreign Firm | Free Trade ($\mu$) | $\pi_{NC} = \frac{[2\varepsilon(1-\underline{\alpha})-1+c]^2}{9\varepsilon(1-\underline{\alpha})}$ | $\pi_{NC}^* = \frac{[\varepsilon(1-\underline{\alpha})+1-c]^2}{9\varepsilon(1-\underline{\alpha})}$ |
| Non Cooperation | antidumping (1- $\mu$) | $\pi_F = \frac{[3\varepsilon(1-\underline{\alpha})-(1-c)]^2}{9\varepsilon(1-\underline{\alpha})}$ | $\pi_F^* = \frac{(1-c)^2}{9\varepsilon(1-\underline{\alpha})}$ |

From theses profits we calculate the expected southern profit under cooperation and under non-cooperation:

$$E_\gamma(\pi_{coop}^*) = \gamma \frac{[\varepsilon(1-\bar{\alpha})+1-c]^2}{9\varepsilon(1-\bar{\alpha})} + (1-\gamma)\frac{(1-c)^2}{9\varepsilon(1-\bar{\alpha})} - K$$

$$E_\mu(\pi_{nc}^*) = \mu \frac{[\varepsilon(1-\underline{\alpha})+1-c]^2}{3\varepsilon(1-\underline{\alpha})} + (1-\mu)\frac{(1-c)^2}{9\varepsilon(1-\underline{\alpha})}$$

And it is easy to show that[xii]:

$$E_\mu(\pi_{nc}^*) < E_\gamma(\pi_{coop}^*) + K$$

**Figure 2: Southern firm decision with $\overline{\alpha}$=0.6 and $\underline{\alpha}$=0.4, c=0.4 and $\varepsilon$=0.35**
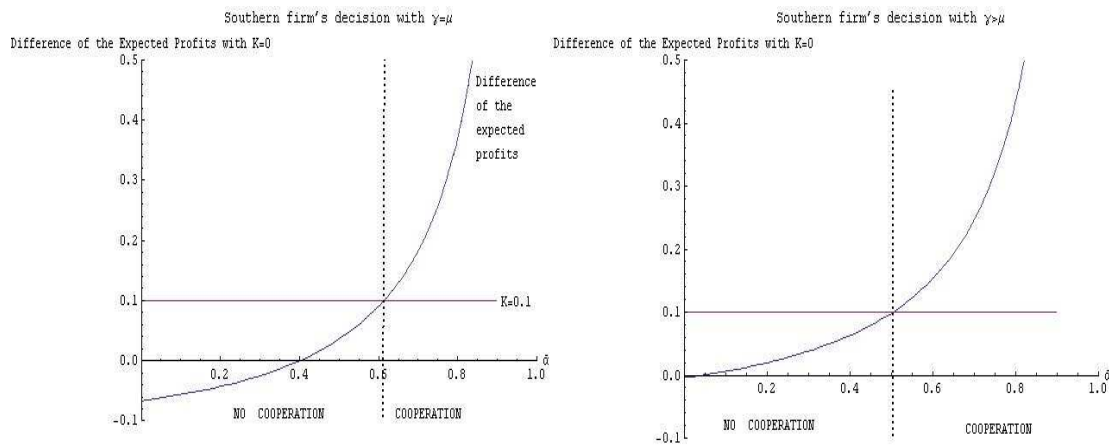


Figure 2 depicts two numerical examples, with $\overline{\alpha} = 0.6$ and $\underline{\alpha} = 0.4, c = 0.4$ and $\varepsilon = 0.35$, to understand the foreign firm's decision. This graph allows us to see that without $K$, the foreign firm will cooperate if $\underline{\alpha} < \overline{\alpha}$. In this example $\underline{\alpha} = 0.4$ if $\overline{\alpha} > 0.4$ the southern firm prefers to cooperate. Introducing compliance costs, this threshold is modified and with $K = 0.1$ it is nearly equal to $0.6$. Thanks to the second graph, with $\mu < \gamma$ the southern firm prefers to cooperate with a lower $\overline{\alpha}$.

To generalize this example, we calculate this threshold by defining the level of $\overline{\alpha} = \tilde{\alpha}$ such

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as $E_\gamma(\pi^*_{coop}) - E_\mu(\pi^*_{nc}) = 0$ :

$$E_\gamma(\pi^*_{coop}) - E_\mu(\pi^*_{nc}) = 0$$

$$\tilde{\alpha} = \frac{-9(E_\mu(\pi^*_{nc}) + K) + 2\gamma(1 - c + \varepsilon) + \sqrt{(9(E_\mu(\pi^*_{nc}) + K) - 2\gamma(1-c))^2 - 4\gamma(1-c)^2}}{2\varepsilon\gamma}$$

**Proposition 2:** *Southern firm's decision If $\mu < \gamma$ and $K > 0$ where a threshold exists.*

- such as $E_\gamma(\pi^*_{coop}) - E_\mu(\pi^*_{nc}) = 0$

  - if $\bar{\alpha} < \tilde{\alpha}$ then the southern firm does not want to cooperate

  - if $\bar{\alpha} = \tilde{\alpha}$ then the southern firm is indifferent to cooperating or not to cooperating.

  - if $\bar{\alpha} > \tilde{\alpha}$ the southern firm agrees to cooperate.

- A raise of the compliance costs induces a higher threshold $\tilde{\alpha}$ and then a lower incentive to cooperate with the antidumping investigation[xiii].

- The negative information campaign implies a decrease of the consumer's credence ( $\underline{\alpha}$ ) which implies an increase of $\tilde{\alpha}$. The smear campaign urges the southern firm to cooperate[xiv].

*The northern firm's decision*

What follows describes the optimal information campaign of the northern firm. As expected the northern firm will always prefer the non-cooperation case because the probability of being protected by an antidumping duty is higher and because it allows the case to proceed with

"facts available", meaning a higher antidumping duty. Then the northern firm's program is

$$Max_{\underline{\alpha}} E_{\mu}(\pi_{nc})$$

$$E_{\gamma}(\pi_{coop}) = \gamma \frac{\left[2\varepsilon(1-\overline{\alpha})-1+c\right]^2}{9\varepsilon(1-\overline{\alpha})} + (1-\gamma)\frac{\left[3\varepsilon(1-\overline{\alpha})-(1-c)\right]^2}{9\varepsilon(1-\overline{\alpha})}$$

$$E_{\mu}(\pi_{nc}) = \mu \frac{\left[2\varepsilon(1-\underline{\alpha})-1+c\right]^2}{9\varepsilon(1-\underline{\alpha})} + (1-\mu)\frac{\left[3\varepsilon(1-\underline{\alpha})-(1-c)\right]^2}{9\varepsilon(1-\underline{\alpha})}$$

$$E_{\mu}(\pi_{nc}) > E_{\gamma}(\pi_{coop})$$

Knowing the threshold $\tilde{\alpha}$ is enough to solve the northern firm's program.

**Proposition 3:** *If $\underline{\alpha} < \alpha$ and $\mu < \gamma$ then for a given $\overline{\alpha}?\alpha$ the northern firm will always prefer the non-cooperative case (the lowest $\in$ because $\frac{\partial E_{\gamma}(\pi)}{\partial \alpha} < 0$ [xv] and the lowest $\gamma$ because $\frac{\partial E_{\gamma}(\pi)}{\partial \gamma} < 0$ [xvi]). Consequently the northern firm will choose the lowest $\underline{\alpha}$ which insures the non-cooperation of the southern firm.*

Finally the program of the northern firm will be very simple since it will engage an information campaign to set $\underline{\alpha}$ which maximizes its profits. Now we know that this firm always prefers the lowest $\underline{\alpha}$, nevertheless if $\underline{\alpha}$ is too low then the southern firm will prefer to cooperate with the antidumping investigations. Consequently, the solution of this program is easy to find: the northern firm will reduce consumer confidence in the southern good. This reduction implies an increase of $\tilde{\alpha}$. So knowing $\overline{\alpha}$ the northern firm must set the lowest $\underline{\alpha}$ which insures the non-cooperation of its rival.

Figure 3 depicts a numerical application which presents the decisions of both firms. In this example, the threshold is equal to $\tilde{\alpha} = 0.25$. Knowing $\overline{\alpha} = 0.24$ , the northern firm can engage in a negative campaigning so as to decrease $\alpha$ from $\overline{\alpha} = 0.24$ to $\underline{\alpha} = 0.2$. This campaign modifies the southern firm's behaviour because it prefers from now on not to cooperate. Without cooperation, the profit of the northern firm increases from $0.07$ to nearly $0.1$.

**Figure 3 : Southern firm's decision and northern firm's decision**

$$(c=0.5, \varepsilon = 0.5, \gamma = 0.5, \mu = 0.2, \underline{\alpha} = 0.2)$$



Southern firm's decision and northern firm's decision
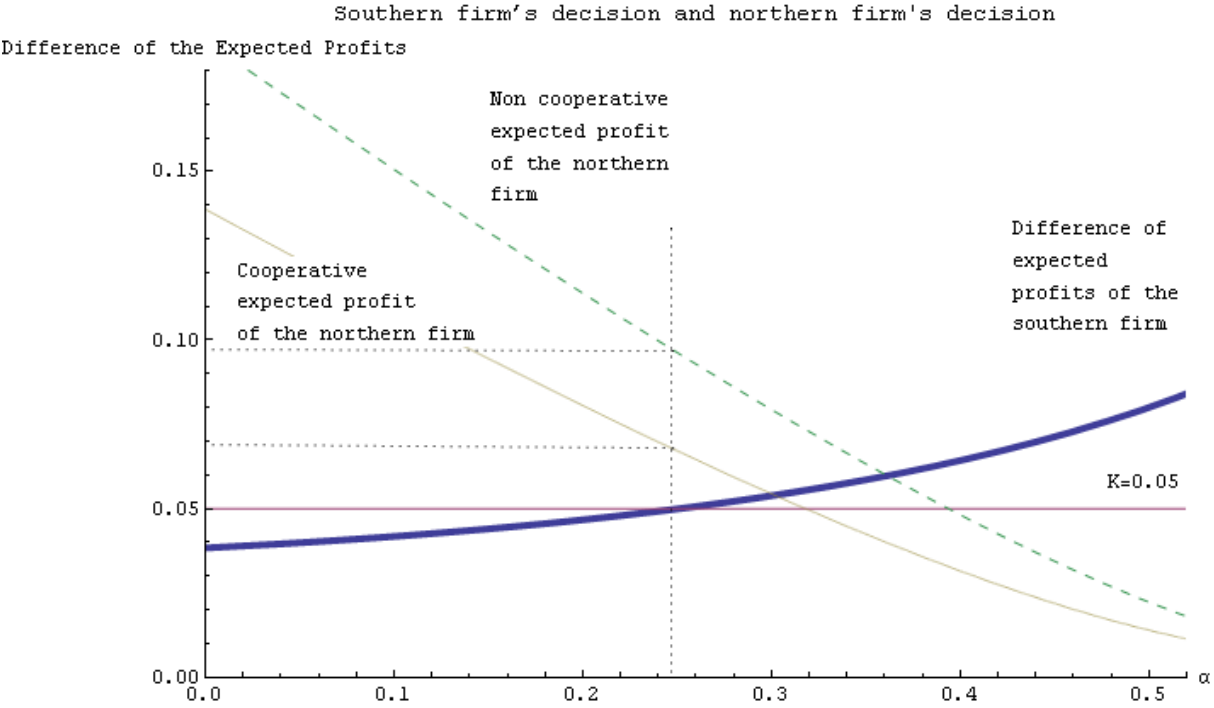
## 4. Conclusion

This article lays information at the core of the antidumping procedure. It shows that complex

asymmetric information between firms, administrative authorities and consumers can deeply impact the dumping margin. In particular, with a new theoretical framework where the goods imported from the south may be ethically unsound, we show that the dumping margin calculus may rest on the subjective probability (from the consumer's point of view) that the southern good is ethically unsound. In this case, the interest of the northern firm is to engage in a negative campaign in order to discourage the foreign firm from actively cooperating in the antidumping investigation and thus increasing the final level of the antidumping duty.

Even if such a result is quite difficult to prove empirically, we hope to present in future research some support to this theoretical finding. In an economic context where protectionism pressures become ever stronger, especially between China and developed countries, with huge environmental and social problems, some evidences could be found with a deeper analysis of the antidumping procedure.

# Appendixes

*Appendix 1*

## Table 3: Prices and Tariffs at the equilibrium

| | Outcome (Probability) | Tariff | Domestic Price | Foreign Price |
|---|---|---|---|---|
| Foreign Firm Cooperation | Free Trade ($\gamma$) | $t = 0$ | $P_C = \dfrac{2+c+2\varepsilon(1-\bar{\alpha})}{3}$ | $P_C^* = \dfrac{1+2c+\varepsilon(1-\bar{\alpha})}{3}$ |
| | antidumping (1- $\gamma$) | $\hat{t}_A = \varepsilon(1-\bar{\alpha})$ | $P_A = \dfrac{2+c+3\varepsilon(1-\alpha)}{3}$ | $P_A^* = \dfrac{2+c+3\varepsilon(1-\bar{\alpha})}{3}$ |
| Foreign Firm Non Cooperation | Free Trade ($\mu$) | $t = 0$ | $P_{NC} = \dfrac{2+c+2\varepsilon(1-\underline{\alpha})}{3}$ | $P_{NC}^* = \dfrac{1+2c+\varepsilon(1-\underline{\alpha})}{3}$ |
| | antidumping (1- $\mu$) | $\hat{t}_F = \varepsilon(1-\underline{\alpha})$ | $P_F = \dfrac{2+c+3\varepsilon(1-\underline{\alpha})}{3}$ | $P_F^* = \dfrac{2+c+3\varepsilon(1-\underline{\alpha})}{3}$ |

## Table 4: Demands at the equilibrium

| | Outcome (Probability) | Domestic Demand | Foreign Demand |
|---|---|---|---|
| Foreign Firm Cooperation | Free Trade ($\gamma$) | $D_C = \dfrac{2\varepsilon(1-\bar{\alpha})-(1-c)}{3\varepsilon(1-\bar{\alpha})}$ | $D_C^* = \dfrac{\varepsilon(1-\bar{\alpha})+1-c}{3\varepsilon(1-\bar{\alpha})}$ |
| | antidumping (1- $\gamma$) | $D_A = \dfrac{3\varepsilon(1-\bar{\alpha})-(1-c)}{3\varepsilon(1-\bar{\alpha})}$ | $D_A^* = \dfrac{1-c}{3\varepsilon(1-\bar{\alpha})}$ |
| Foreign Firm Non Cooperation | Free Trade ($\mu$) | $D_{NC} = \dfrac{2\varepsilon(1-\underline{\alpha})-1+c}{3\varepsilon(1-\underline{\alpha})}$ | $D_{NC}^* = \dfrac{\varepsilon(1-\underline{\alpha})+1-c}{3\varepsilon(1-\underline{\alpha})}$ |
| | antidumping (1- $\mu$) | $D_F = \dfrac{3\varepsilon(1-\underline{\alpha})-(1-c)}{3\varepsilon(1-\underline{\alpha})}$ | $D_F^* = \dfrac{1-c}{3\varepsilon(1-\underline{\alpha})}$ |

*Appendix 2*

$$\frac{\partial E_{\gamma}(\pi_{coop}^{*})}{\partial \overline{\alpha}} = \varepsilon \left( \frac{1-c}{3\varepsilon(1-\overline{\alpha})} \right)^{2} - \frac{\gamma\varepsilon}{9} > 0$$

$$\Leftrightarrow \left( \frac{1-c}{\varepsilon(1-\overline{\alpha})} \right)^{2} > \gamma$$

$$\Leftrightarrow \left( \frac{1-c}{t_{A}} \right)^{2} > \gamma \Leftrightarrow 1-c-t_{A}\sqrt{\gamma} > 0$$

$$\frac{\partial E_{\gamma}(\pi_{coop}^{*})}{\partial \gamma} = \frac{\varepsilon(1-\overline{\alpha}) + 2(1-c)}{9} > 0$$

$E_{\gamma}(\pi_{coop}^{*})$ is increasing in $\overline{\alpha}$ and $\gamma$. The non-cooperation of the firm implies a lower $\alpha$

and a lower probability $\mu$ and consequently a lower expected profit if we do not consider K.

*Appendix 3*

Sign of $\dfrac{\partial \tilde{\alpha}}{\partial K}$

$$\frac{\partial \tilde{\alpha}}{\partial K} = \frac{-9 + \dfrac{9\left[9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c)\right]}{\sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}}}{2\varepsilon\gamma}$$

$$\Leftrightarrow -9 + \frac{9\left[9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c)\right]}{\sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}} > 0$$

$$\Leftrightarrow \frac{9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c)}{\sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}} > 1$$

It is always verified.

*Appendix 4*

Sign of $\dfrac{\partial \tilde{\alpha}}{\partial \underline{\alpha}}$

$$E_{\gamma}(\pi_{coop}^{*}) - E_{\mu}(\pi_{nc}^{*}) = 0$$

$$\Leftrightarrow \frac{-9(E_{\mu}(\pi_{nc}^{*}) + K) + 2\gamma(1 - c + \varepsilon) + \sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}}{2\varepsilon\gamma}$$

$$\tilde{\alpha} > 0 \Leftrightarrow \sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}} > 9(E_{\mu}(\pi_{nc}^{*}) + K) + 2\gamma(1 - c + \varepsilon)$$

$$\frac{\partial \tilde{\alpha}}{\partial \underline{\alpha}} = \frac{-9\dfrac{\partial E_{\mu}(\pi_{nc}^{*})}{\partial \underline{\alpha}} + \dfrac{9\dfrac{\partial E_{\mu}(\pi_{nc}^{*})}{\partial \underline{\alpha}}}{2\sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}}}{2\varepsilon\gamma}$$

$$\frac{\partial \tilde{\alpha}}{\partial \underline{\alpha}} = = \frac{9}{2\varepsilon\gamma} \frac{\partial E_{\mu}(\pi_{nc}^{*})}{\partial \underline{\alpha}} \left[ -1 + \frac{1}{2\sqrt{(9(E_{\mu}(\pi_{nc}^{*}) + K) - 2\gamma(1-c))^{2} - 4\gamma(1-c)^{2}}} \right] < 0$$

$$\text{because} \frac{\partial E_{\mu}(\pi_{nc}^{*})}{\partial \underline{\alpha}} > 0$$

*Appendix 5*

Sign of $\dfrac{\partial E_{\gamma}(\pi)}{\partial \alpha}$

$$\frac{\partial E_\gamma(\pi)}{\partial \alpha} = \frac{(1-c)^2 - \varepsilon^2(1-\alpha)^2(9-5\gamma)}{9\varepsilon(1-\alpha)^2} < 0 \Leftrightarrow (1-c)^2 < \varepsilon^2(1-\alpha)^2(9-5\gamma)$$

$$\Leftrightarrow (1-c) < \varepsilon(1-\alpha)(9-5\gamma)^{1/2} \text{ satisfied with the previous condition.}$$

$$\Leftrightarrow \left(\frac{1-c}{\varepsilon(1-\bar{\alpha})}\right)^2 > \gamma \Leftrightarrow \left(\frac{1-c}{t_A}\right)^2 > \gamma \Leftrightarrow 1-c-t_A\sqrt{\gamma} > 0$$

Sign of

$$\frac{\partial E_\gamma(\pi)}{\partial \gamma}$$

$$\frac{\partial E_\gamma(\pi)}{\partial \gamma} = \frac{2(1-c)-5\varepsilon(1-\alpha)}{9} < 0 \Leftrightarrow 1-c < \frac{5}{2}\varepsilon(1-\alpha)$$

It is satisfied with the previous condition.

**References:**

Anderson, J.E., 1994, "Strategic Lobbying and Antidumping", *Journal of Economic Integration*, 9 (2), 129-55.

Baldwin, R.E. and Moore, M.O., 1991, "Administration of the Unfair Trade Laws by the Department of Commerce: a Political Economy Analysis". In: Boltuck, R., Litan, R. (Eds.), *Down in the Dumps: Administration of U.S. Trade Remedy Law*, Brookings Institution, Washington, DC, 253-- 280.

Bandyopadhyay, N. 2008, *Antidumping Investigation in Agriculture: Issue of Trade Diversion-Named Vs Non-named Countries*, Master's Thesis, Graduate Faculty of the Louisiana State University.

Bandyopadhyay, S., S. Lahiri and S. Roy, 2008. "Political Asymmetry and Common External Tariff in a Customs Union," *Working Papers 2007-038*, Federal Reserve Bank of St. Louis.

Bhagwati, J. N., 1982, "Directly-Unproductive Profit-Seeking (DUP) Activities", *Journal of Political Economy,* 90, 988 -- 1002.

Blonigen, B. A., 2006, "Evolving Discretionary Practices of U.S. Antidumping Activity", *Canadian Journal of Economics*, 39, 874--900.

Blonigen, B. A. and T. J. Prusa, 2003, "Antidumping", in E.K. Choi and J. Harrigan (Eds.), *Handbook of International Trade*. Oxford, U.K. and Cambridge, MA: Blackwell Publishers, 251-284.

Boltuck, R. D. and R. E. .Litan (eds.), 1991, *Down in the Dumps : Administration of the Unfair Trade Laws*, Washington DC, The Brookings Institution.

Bown, C. P., 2009a, The Pattern of Antidumping and Other Types of Contingent Protection, *World Bank, PREM Notes* 144, 21 october.

Bown, C. P., 2009b, "Protectionism Is on the Rise: Antidumping Investigations", chapter 11

in Richard Baldwin and Simon Evenett, eds. *The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendations for the G20.* VoxEU.org e-book, march.

Cardebat, J.M. and P. Cassagnard, 2010, "North-South Trade and Supervision of the Social Quality of Goods from the South", *Review of International Economics*, 18(1), 168-178.

Cheng, L. K., L. D. Qiu, and K. P. Wong, 2001, "Anti-Dumping Measures as Tool of Protectionism: A Mechanism Design Approach", *Canadian Journal of Economics*, 34, 639--660.

Darby, M.R., and D., Karny, 1973, "Free Competition and the Optimal Amount of Fraud", *Journal of Law and Economics,* 16, 67-68.

Ethier, W., J. and R., D., Fischer, 1987, "The New Protectionism", *Journal of International and Economic Integration*, 2, 1-11.

Fischer; R.D., 1992, "Endogenous Probability of Protection and Firm Behavior", *Journal of International Economics*, 32 (2), 149-163.

Finger, J.M., N. Artis, (Eds.), 1993. *Antidumping: How It Works and Who Gets Hurt.* University of Michigan Press, Ann Arbor.

Goldberg, P.K. and G. Maggi, 1999. "Protection for Sale: An Empirical Investigation," *American Economic Review*, American Economic Association, 89(5), 1135-1155, December.

Gallaway M.P., Blonigen B.A. and Flynn J.E.,1999, "Welfare Costs of US Antidumping and Countervailing Duty Laws", *Journal of International Economics*, 49, 211-244.

Grossman, G.M. and E. Helpman, 1994, "Protection for Sale", *American Economic Review,* 84, 833-50.

Gupta, P., Panagariya, A., 2006. "Injury Investigations in Antidumping and the Super-Additivity Effect: A Theoretical Explanation", *Review of World Economics (Weltwirtschaftliches Archiv)*, Springer, 142(1), 151-164, april.

Hansen, W. and T. J. Prusa, 1996, "Cumulation and ITC Decision-Making: The Sum of the Parts is Greater than the Whole", Economic Enquiry, 34, 746-69.

Hansen, W.L. and T.J. Prusa, 1996, "Economics and Politics: An Empirical Analysis of ITC Decision Making", *Review of International Economics*, 5(2): 230-45.

Hillman, A.L., E. Katz and J. Rosenberg, 1987, "Workers as Insurance: anticipated government assistance and factor demand", *Oxford Economic Papers* 39,.813--820.,

Khatibi, A., 2009, "The trade effects of European Antidumping Policy", *ECIPE Working Paper*, 07/2009.

Leidy and Hoekman, 1990, "Production Effects of Price- and Cost-Based Anti-dumping Laws under Flexible Exchange Rates", *Canadian Journal of Economics*, 23, 873-895.

Leidy, M.P. and B. Hoekman, 1991, "Spurious Injury as Indirect Rent Seeking: Free Trade under the Prospect of Protection", *Economics and Politics*, 3 (2), 111-137.

Lindsey, B., 1999, "The US Antidumping Law: Rhethoric versus Reality", *CATO Institute Center for Trade Policy Studies Working Paper n ° 7*

Lindsey, B. and D. J. Ikenson , 2003, *Antidumping Exposed, The Devilish Details of unfair Trade Law*, *CATO Institute*, Washington DC.

Mayer, W., 1984, "Endogenous Tariff Formation", *American Economic Review*, 74(5), 970-85, December.

Mitra, D. and Panagariya, 2004, *The Political economy of Trade, Aid and Foreign Investment Policies,* Elsevier.

Moore, M. O, 2005, "Facts available dumping allegations: when will foreign firms cooperate in antidumping petitions?", *European Journal of Political Economy*, 21, 185--204.

Moore, M.O. and S.M. Suranovic, 1992, "Lobbying vs Administered Protection: Endogenous Industry Choice and National Welfare", *Journal of International Economics*, 32(3-4): 289-303.

Mussa, R. and Rosen, S., 1978, "Monopoly and Product Quality", *Journal of Economic Theory*, 5, 511-513.

Murray, T., 1991, "The Administration of the Antidumping Law by the Department of Commerce", In R. D. Boltuck. and R. E. .Litan (eds.),1991, *Down in the Dumps: Administration of the Unfair Trade Laws*, Washington DC, The Brookings Institution, 23-56.

Palmeter, D. N.,1991, "The Antidumping Law: A Legal and Administrative Nontariff Barrier.", In R. D. Boltuck. and R. E. Litan (eds.),1991, *Down in the Dumps : Administration of the Unfair Trade Laws*, Washington DC, The Brookings Institution, 64-89.

Prusa, T., 1992, "Why are so many Antidumping Petitions Withdrawn?", *Journal of International Economics,* 33, 1-20.

Rodrik, D., 1986, "Tariffs, Subsidies, and Welfare with Endogenous Policy," *Journal of International Economics*, 21(3-4), 285-299, november.

Rodrik, D., 1995, "Political Economy of Trade Policy", Chapter 28 in: G.M. Grossman and K. Rogoff, eds., *Handbook of International Economics*, 3, 1457-94.

Rosendorff, B.P., 1996, "Voluntary Export Restraints, Antidumping Procedure, and Domestic Politics", *American Economic Review*, 86: 544-61.

Staiger, R.W and Wolak, F.A., 1989. "Strategic Use of Antidumping Law to Enforce Tacit International Collusion," *NBER Working Papers,* 3016.

Tandé, F., 2006, "Taxes antidumping et règle des faits disponibles", *Revue économique*, 57 (5), 1053-1063.

Webb, M., 1992, "The Ambiguous Consequences of Anti-dumping Laws", *Economic Inquiry*; 30, 3, 437-448, july.

[i] The WTO reports that during the second half of 2009 the goods affected by the AD procedure were in the chemicals sector (47 initiations), the base metals sector (45 initiations), textiles sector (20 initiations) and plastic and rubber sector (31 initiations). Source: http://www.wto.org.

[ii] Antidumping initiation implies that at least 50% of the domestic industry is not opposing the petition.

[iii] More generally, tariffs determined by lobbying is quite ordinary in trade policy literature, see for example Mayer (1984), Rodrik (1986 and 1995), Grossman and Helpman (1994), Goldberg and Maggi (1999), Mitra and Panagariya (2004) or Bandyopadhyay et al. (2008).

[iv] For example, US Department of Commerce set high compliance costs described by Murray (1991), Palmeter (1991) and Finger and Artis (1993): 200-page questionnaires, tight and inflexible deadlines, specific style to report data. Moreover, if the foreign firm is partially cooperative then all the information provided will not be used.

[v] Moore (2005) explains this non participation in negotiations. He even shows that a firm can make this choice without engaging in dumping. Problems seem to be due to a lack of information on the foreign firm, a difficulty to evaluate the dumping margin and diverse costs linked to the information revelation. Hansen and Prusa (1996) and Gupta and Panagariya (2006) propose another explanation: the presence of many exporters increases the free-rider problem and then it urges the firms to invest less on defence. Consequently, injury finding is positively related to the number of defendants.

[vi] During the period 1980-1990, the American Department of Trade's use of "facts available" leads to dumping margins that are 38% higher than the average 29% margin. (Baldwin and Moore, 1991).

[vii] The model gives too another explanation of the high dumping margins described by Baldwin and Moore (1991). It also confirms that the antidumping procedure generates "directly unproductive profits" (Bhagwati, 1982 and developed among others by Hillman, Katz and Rosenberg, 1987, Ethier and Fisher,1987, Leidy and Hoekman, 1990 and 1991).

[viii] To simplify we assume that this information campaign is not costly for the northern firm and there is no uncertainty concerning the success of this campaign.

[ix] Like Moore (2005), we assume that if the southern firm agrees to cooperate with the investigations then the administering authority will be less severe. By withholding information, the southern firm decreases the probability of winning the petition compared with the cooperative case. Even if this assumption seems to be obvious, Murray (1991), Palmeter (1991) and Lindsey (1999) argue it is probably not consistent with the US department of commerce procedure. Nonetheless, Blonigen (2003) claims it is not a "serious criticism" of Moore's model.

[x] Consumers' interests are not mentioned in the WTO Antidumping Code. Considering the case where the government only cares about producer welfare, we have $W2 = \pi + t \cdot D^*$ and then $\frac{\partial W2}{\partial t} = 0 \Leftrightarrow t_{F2} = \frac{1}{4}\left[1 - c + 7\varepsilon(1 - \underline{\alpha})\right]$ or $t_{A2} = \frac{1}{4}\left[1 - c + 7\varepsilon(1 - \overline{\alpha})\right]$. Unsurprisingly, the optimal tariff without considering consumers' interests will be higher. In this case, the sensibility of the anti-dumping duty to $\varepsilon$ and to $\alpha$ is also higher and the following conclusions will not change.

[xi] The prices and the demands at the equilibrium are in the appendix of this paper.

[xii] Proof in appendix 2.

[xiii] Proof in appendix 3.

[xiv] Proof in appendix 4.

[xv] Proof in appendix 5.

[xvi] Proof in appendix 5.