Money Burning in Trade Agreements

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Motivation

- Dumping occurs when foreign firms price in their export market either below the price charged in its home market or below its cost of production.
- If such dumping is found to be “injuring” the domestic industry, the government agencies then can impose an antidumping (AD) duty.
- However, Prusa (2005) says: “Isn’t AD the policy that corrects a dumping problem? The short answer, is no. As it turns out, the link between dumping and anti-dumping duties is tenuous.”
Motivation

- In particular, Prusa points out two potential problems of the AD duty: (1) lack of economic foundation, (2) discretion.
- Question: If the AD duty has little informational content, why would people waste resources to perform injury or margin calculations?
Overview

- This paper focuses on two parts:
- First, this paper provides the sufficient conditions when it is optimal to burn money (wasteful administrative costs).
- Second, we demonstrate that these assumptions can be satisfied in the oligopoly trade model. Also, we show how the optimal trade agreements look like: the optimal trade agreements consist of tariff caps as well as burning money before high tariff sanctions are used.
- We find that if the implementation of trade agreements involve money burning, it makes the optimal trade agreements closer to the first-best.
Some Related Literature

- Optimal Trade Agreements: Amador-Bagwell (2013)
Two countries: domestic and foreign.

Two goods: domestic country exports good $B$ and imports good $A$.

Single policy instrument: tariff.

The objective of each county is to maximize a weighted sum of producer surplus, consumer surplus and tariff revenue, with a relatively greater weight on import-competing producer surplus.

Due to a symmetric setting across goods in the model, we will focus on the good $A$. 

The design of the trade agreements in the presence of uncertainty is similar to Bagwell-Staiger (2005).

The political pressure is unknown at the time when the trade agreement is negotiated and the government learns its private information before it applies the preferred tariff.

In particular, the objective for the domestic country is

\[ \gamma \pi(\tau) + b(\tau), \]

where \( \tau \) is the tariff, \( \pi \) is the producer surplus, \( b \) is the sum of the consumer surplus and the tariff revenue, \( \gamma \) is the political pressure that is put on the import competing producer surplus with density functions \( (f(\gamma), F(\gamma)) \).

Denote the foreign country’s welfare as \( v(\tau) \).

\( \pi, b \) and \( v \) depend on the values of \( \tau \).
A social planner proposes the optimal trade agreements.

Due to the information structure, this trade agreements depend on the realization of the political pressure \(\tau(\gamma)\).

Also, the agreements must be incentive compatible.

To be more specific, the optimal trade agreement problem can be stated as follows:

$$\max_{\tau(\gamma), t(\gamma)} \int_{\Gamma} \left[ b(\tau(\gamma)) + v(\tau(\gamma)) + \gamma \pi(\tau(\gamma)) - t(\gamma) \right] dF(\gamma)$$

$$\gamma \in \arg \max_{\tilde{\gamma}} \left\{ \gamma \pi(\tau(\tilde{\gamma})) + b(\tau(\tilde{\gamma})) - t(\tilde{\gamma}) \right\}, \forall \gamma \in \Gamma$$

$$t(\gamma) \geq 0$$
Assumptions

- We will assume the corresponding assumptions hold true:

Assumption

1. $\pi(\tau), v(\tau), b(\tau), t(\tau)$ are twice differentiable with $\pi'(\tau) > 0$, $v'(\tau) < 0$.
2. $\gamma \pi(\tau) + b(\tau)$ has a unique interior maximum, which denoted as $\tau_f(\gamma)$. This implies that $b'(\tau) < 0$, and $\gamma \pi''(\tau) + b''(\tau) < 0$ for all $\tau \in [\tau_L, \tau_H]$.

- These assumptions are standard in the trade model.
Sufficient Conditions when Money Burning is Optimal

**Proposition**

Assume the following holds for $\gamma$ in $[\gamma_L, \gamma_H]$:  
(A1) $\nu''(\tau) + \pi''(\tau) \frac{1-F(\gamma)}{f(\gamma)} < 0$,  
(A2) there exists a non-decreasing $\tau_b(\gamma)$ such that $\nu'(\tau_b(\gamma)) + \pi'(\tau_b(\gamma)) \frac{1-F(\gamma)}{f(\gamma)} = 0$,  
(A3) $\tau_b(\gamma) < \tau_f(\gamma)$,  
then burning money is optimal in the region $[\gamma_L, \gamma_H]$, where the amount of money burned is defined as  
$$t(\gamma) = \gamma \pi(\tau_b(\gamma)) + b(\tau_b(\gamma)) - \int_{\gamma_L}^{\gamma} \pi(\tau(\tilde{\gamma})) d\tilde{\gamma} - \gamma_L \pi(\tau(\gamma_L)) - b(\tau(\gamma_L)),$$
$$t(\gamma_L) = 0.$$
Sufficient Conditions Restated

Corollary

*If we assume the political pressure follows Pareto distribution (1,1), the conditions boil down to*

(A4): \( v''(\tau) + \gamma \pi''(\tau) < 0 \)

(A5): \( b'(\tau) < v'(\tau) \).

- The key assumptions that make money burning optimal would be (1) concavity, and (2) domestic country has incentive to set higher tariff.
Discussions

- The formulation of the political pressure is similar to the setting in Bagwell-Staiger (2005). However, they study different trade agreements under the perfectly competitive model.

- The proof of the proposition is similar to Amador-Bagwell (2013). They study the optimal delegation problem and apply them to the tariff caps.

- In the published version of Amador-Bagwell (2013), they provide the conditions when it is optimal “NOT” to burn money although burning money is in the choice set.

- Instead, I use the tariff as the choice variable (domestic producer surplus in Amador-Bagwell (2013)). It allows me to simplify the conditions and focus on the welfare changes in response to tariff.
One natural question is whether there exists a trade model that satisfies the assumptions.

Under perfectly competitive environment, the concavity is usually not satisfied.

For the second half of the presentation, I will show that the conditions are satisfied under the oligopoly trade model, and obtain the optimal trade agreements combining the proposition and the results from Amador-Bagwell (2013).

The implications are that it is optimal to have tariff bindings at the low tariff region, and incurring the cost before a country applies high tariffs.
Oligopoly and Trade: Model

- Let domestic utility from consumption of the oligopolistic goods be

  \[ u(x, y) = 3(x + y) - \frac{1}{2}(x^2 + \frac{1}{2}xy + y^2), \]

  where \( x \) denotes the goods produced by domestic firm while \( y \) denotes the goods produces by the foreign firms.

- Similarly, the foreign utility from consumption of the goods \( y^* \) be

  \[ u^*(y^*) = 3y^* - \frac{1}{4}(y^*)^2. \]

- Firms compete using prices, i.e. Bertrand competition. Further I assume that foreign firms can only charge the same price for \( y \) and \( y^* \).
Let $p$ be the price for the domestic firm, while $p^*$ is the price for the foreign firm. This yields linear inverse demand functions:

$$p = 3 - \frac{1}{2}(x + \frac{1}{2}y), \quad p^* = 3 - \frac{1}{2}(\frac{1}{2}x + y), \quad y^* = 2(3 - p^*).$$

On the cost side, we assume constant marginal cost ($\frac{1}{2}$) and ignore fixed costs.

If we look for interior equilibria (both firms sell positive amount in the domestic market), the Bertrand-Nash prices and quantities are

$$p = \frac{8}{45}\tau, \quad p^* = \frac{32}{45}\tau$$

$$x = \frac{4}{9}[\frac{5}{2} - \frac{2}{9}\tau], \quad y = \frac{4}{9}[\frac{5}{2} - \frac{7}{9}\tau].$$
Oligopoly and Trade

- Imports fall to zero when the tariff reaches the threshold value at
  \[ \tau^B = \frac{24}{15}. \]

- Although \( \tau^B \) forbids foreign country from exporting, it does not give the domestic firm the monopolist price, which the tariff level would be
  \[ \tau^C = \frac{15}{8}. \]

- Under the corner solution region \( \tau^B < \tau < \tau^C \), the domestic producer surplus is concave in the tariff
  \[ \frac{\partial^2 \pi}{\partial \tau^2} = -8. \]

Furthermore, the conditions in the proposition are satisfied under the Pareto distribution (1,1).
I will demonstrate what would be the optimal tariff under the oligopoly model.

For the region of \( \tau < \tau^B \), I will use the proposition 1 in Amador-Bagwell (2013), and it shows that we will have tariff bindings in this low tariff region.

For the region where \( \tau^B \leq \tau \leq \tau^C \), we will use the proposition, and show that it is optimal to burn money.

In sum, allowing burning money, it makes the trade agreement closer to the first best outcome, which will be shown in the next slide.
Numerical Result

Figure: Optimal Trade Agreements
The purposes of this project are two fold.

First, we provide the conditions where it is optimal to burn some money before applying the tariff.

Second, we demonstrate these assumptions are satisfied in the oligopoly trade model. Also, we show how the optimal trade agreement would look like in this setting. It turns out the optimal trade agreement consists of binding tariffs as well as burning money before applying the high tariffs.