Trade Wars and Trade Talks

Gene Grossman and Elhanan Helpman, *Journal of Political Economy*, 1995

Xiang Kerwin Liao

Darla Moore School of Business
University of South Carolina

ECON 860 – International Trade Theory
Fall 2021

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Motivation

- Uruguay Round trade pact, North American Free Trade Agreement, trade conflict between U.S. and Japan

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- Special-interest groups are visible and vocal
- Need a formal framework to capture both strategic interactions between
  - interest groups and politicians in the domestic arena
  - governments in the international arena
- Goal of this paper:
  - how the political climate in one country conditions policy outcomes in another
  - how domestic political pressures on politicians condition their relations with foreign counterparts

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- The incumbents choose a vector of trade taxes and subsidies on the various import and export goods. The objective is to maximize their own political welfare.

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- Each lobby confronts its national government with a campaign contribution schedule, a schedule relating its promised gift to the action taken by the government.
- The incumbents choose a vector of trade taxes and subsidies on the various import and export goods. The objective is to maximize their own political welfare.
- Focus on interactions between countries.
  - Characterize the Nash equilibrium of a non-cooperative game between the two politically motivated governments
  - Consider a bargaining situation in which policies are set in an international arena

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- $x_i = d_i(p_i)$ is the demand for each good as a function of the domestic price.
- $x_0 = E - \sum_{i=1}^{n} p_i d_i(p_i)$ is the demand for the numeraire good as a function of domestic prices.

Indirect Utility

- This setup gives us an indirect utility function of:

$$V(\mathbf{p}, E) = E + s(\mathbf{p})$$

where $s(\mathbf{p}) = \sum_{i=1}^{n} u_i [d_i(p_i)] - p_i d_i(p_i)$.

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- Roy's identity tell us that $y_i(p_i) = \pi_i'(p_i)$.

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- $\tau_i < 1$ represents an import subsidy or an export tax

Lobbying Groups

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- In this paper, the author omits one argument of contribution to help distinguish the case of trade war from that of trade talks. The welfare of each industry is $V_i = W_i - C_i(\boldsymbol{\tau}, \cdot)$, where:

$$W_i(\mathbf{p}) = I_i + \pi_i(p_i) + \alpha_i[r(\boldsymbol{\tau}, \boldsymbol{\pi}) + s(\mathbf{p})]$$

and I_i is the total labor supply and income in industry i and α_i is the fraction of the electorate that owns part of the specific factor used in i.

Government

- The government chooses to maximize the objective function:

$$G = \sum_{i=1}^{N} C_i(\boldsymbol{\tau}, \cdot) + aW(\boldsymbol{\tau}, \boldsymbol{\pi})$$

where $W(\boldsymbol{\tau}, \boldsymbol{\pi})$ represents gross societal welfare, L is the set of industries with a lobbying group, and a is a non-negative constant representing the trade-off between societal welfare and political contributions.

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- $W(\mathbf{p})$ can be written as:

$$W(\boldsymbol{\tau}, \boldsymbol{\pi}) = I + \sum_{i=1}^{N} \pi_i(p_i) + [r(\boldsymbol{\tau}, \boldsymbol{\pi}) + s(\mathbf{p})]$$

International Equilibrium

- $M_i(p_i) + M_i^*(p_i^*) = 0, i = 1, 2, ..., n.$
- $M_i(p_i)$: net imports of good i in the home country
- $M_i^*(p_i^*)$: net imports of good i in the foreign country
- Used to solve for market-clearing price of good X_i as a function of the industry trade taxes or subsidies imposed by the two countries
- $\pi_i(\tau_i, \tau_i^*)$ denotes the functional relationship above
- If the home country were to increase its tariff on imports of some good and the foreign country increased its export subsidy by the same percentage amount, then the world price would fall so as to leave the domestic prices in each country unchanged.

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Equilibrium Response

Definition

Let $\boldsymbol{\tau}^*$ be an arbitrary trade policy vector of the foreign country. Then a set of feasible contribution functions $\left\{C_i^0\right\}_{(i\in L)}$ and a trade policy vector $\boldsymbol{\tau^0}$ are an equilibrium response to $\boldsymbol{\tau}^*$ if (a)

$$\boldsymbol{\tau^0} = \arg\max_{\boldsymbol{\tau}} \sum_{i\in L} C_i^0(\boldsymbol{\tau};\boldsymbol{\tau}^*) + aW(\boldsymbol{\tau},\boldsymbol{\tau}^*) \tag{1}$$

and (b) for every organized interest group $i \in L$ there does not exist a feasible contribution function $C_i(\boldsymbol{\tau};\boldsymbol{\tau}^*)$ and a trade policy vector τ^i such that (i)

$$\boldsymbol{\tau^i} = \arg\max_{\boldsymbol{\tau}} \sum_{i\in L} C_i(\boldsymbol{\tau};\boldsymbol{\tau}^*) + \sum_{j\neq i} C_j^0(\boldsymbol{\tau};\boldsymbol{\tau}^*) + aW(\boldsymbol{\tau},\boldsymbol{\tau}^*) \tag{2}$$

and (ii)

$$W_i(\boldsymbol{\tau^i},\boldsymbol{\tau}^*) - C_i(\boldsymbol{\tau^i};\boldsymbol{\tau}^*) > W_i(\boldsymbol{\tau^0},\boldsymbol{\tau}^*) - C_i(\boldsymbol{\tau^0};\boldsymbol{\tau}^*) \tag{3}$$

Equilibrium Explanation

- This part shows a purely non-cooperative outcome process and result. Though unlikely to happen, it is an extreme case and an anchor to consider for other situations.

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Equilibrium Explanation

- This part shows a purely non-cooperative outcome process and result. Though unlikely to happen, it is an extreme case and an anchor to consider for other situations.
- The first condition stipulates that the politicians select the policy vector that best serves their own interest, given the policy of the foreign government and the contribution schedules offered by the domestic lobbies.
- The second condition states that given the set of contributions offered by all lobbies other than itself, no individual lobby i can improve its lot by setting a contribution schedule $C_i(\cdot)$ different from $C_i^0(\cdot)$, thereby inducing the home government to choose the policy vector $\boldsymbol{\tau}^i$.

Nash Equilibrium

- Definition of a full equilibrium in the trade war.

Definition

A non-cooperative trade policy equilibrium consists of sets of political contribution functions $\left\{C_i^0\right\}_{i\in L}$ and $\left\{C_i^{*0}\right\}_{i\in L^*}$ and a pair of trade policy vectors τ^* and τ^{*0} such that $[\left\{C_i^{*0}\right\}_{i\in L^*}, \boldsymbol{\tau}^0]$ is an equilibrium response to τ^{*0} and $[\left\{C_i^{*0}\right\}_{i\in L^*}, \boldsymbol{\tau}^{*0}]$ is an equilibrium response to $\boldsymbol{\tau}^{*0}$.

Equilibrium Policy

- Home country's equilibrium policy

$$\tau^0 - 1 = -\frac{I_{iL} - \alpha_L}{a + \alpha_L} \frac{y_i}{\pi_i M_i'} + \frac{1}{e_i^*} \text{ for } i = 1, 2, ..., n \quad (4)$$

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- Foreign country's equilibrium policy:

$$\boldsymbol{\tau}^{*0} - 1 = -\frac{l_{iL}^* - \alpha_L^*}{a^* + \alpha_L^*} \frac{y_i^*}{\pi_i M_i^{*\prime}} + \frac{1}{e_i} \text{ for } i = 1, 2, ..., n$$

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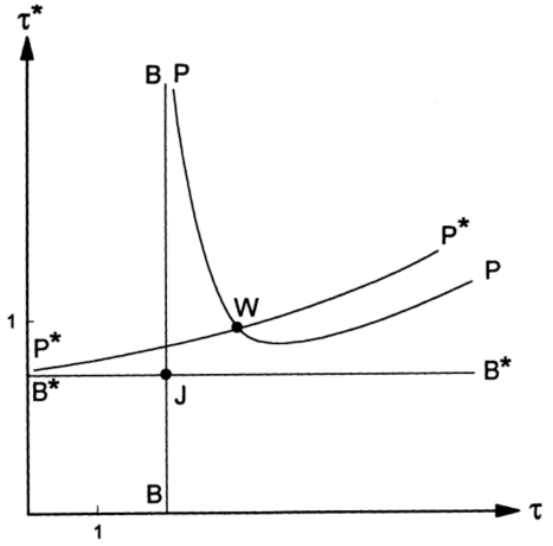
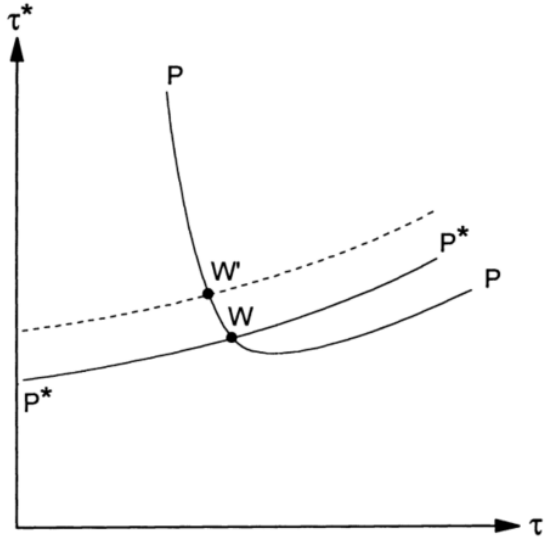
- An organized import-competing industry emerges from a trade war with a protective tariff (since $e_i^* > 0$ when the foreign country exports good i), whereas an unorganized home export industry suffers an export tax (since $e_i^* < 0$ when the foreign country imports good i).

Trade War Equilibrium



Change in Political Environment



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Factors of Interest

- Political cost is included in maximizing benefits from politicians' perspective.
- G: home country's welfare
- G^*: foreign country's welfare
- τ: home country's trade policy
- τ^*: foreign country's trade policy
- R: transfer payment

Country Goals

- Home Country wants to maximize:

$$G = \sum_{i \in L} C_i(\boldsymbol{\tau}, \boldsymbol{\tau}^*) + a[W(\boldsymbol{\tau}, \boldsymbol{\tau}^*) + R]$$

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- If two countries want to achieve efficiency, they should maximize weight sum of both welfare $a^* G + a G^*$.

Equilibrium in a 2-stage Game

The two steps are as below:

- Step 1: Lobby groups set contribution schedules non-cooperatively
- Step 2: Governments bargain in the international arena

There are three conditions in this Definition and can be summaried into two points:

- Settlement is efficient from the point of view of the two negotiating governments. Efficiency here means maximization of the joint welfare of the two sets of politicians.
- It is impossible for any organized lobby group in the home/foreign country to gain by restructuring its contribution schedule, considering that the two governments will settle on a different agreement when one of them faces an altered set of political incentives.

Characteristics of this Game

The structure of this two-country game is almost identical to the one that characterizes policy setting in a small country.

- No identifiable agents in $a^*G + aG^*$
- Two sets of lobby groups decide their contribution schedules 1) simultaneously and 2) non-cooperatively

The negotiated policy outcome must maximize the joint welfare of each organized lobby and the hypothetical mediator.

$$
\begin{aligned}
(\boldsymbol{\tau}^0, \boldsymbol{\tau}^{*0}) = \arg\min_{(\boldsymbol{\tau},\boldsymbol{\tau}^*)} & a^*[W_j(\boldsymbol{\tau},\boldsymbol{\tau}^*) - C_j^0(\boldsymbol{\tau},\boldsymbol{\tau}^*)] \\
& + a^* \sum_{i\in L} C_i^0(\boldsymbol{\tau},\boldsymbol{\tau}^*) + a \sum_{i\in L^*} C_i^{*0}(\boldsymbol{\tau}^*,\boldsymbol{\tau}) + a^* a[W(\boldsymbol{\tau},\boldsymbol{\tau}^*) \\
& + W^*(\boldsymbol{\tau}^*,\boldsymbol{\tau})] \text{ for all } j \in L
\end{aligned}
$$

Equilibrium Policy Ratio

As authors derive, the equilibrium policy ratio in industry i is :

$$(\boldsymbol{\tau}^i, \boldsymbol{\tau}^{*0}) = \left(-\frac{I_{iL}}{a} \frac{y_i}{\pi_i M_i'} \right) - \left(-\frac{I_{iL}^*}{a^*} \frac{y_i^*}{\pi_i M_i^{*\prime}} \right)$$

for $i = 1, 2, ..., n$.

- Allocation resources does not depend separately on τ_i and τ_i^*, and neither does the joint welfare available to the two sets of politicians.

From Negligible to General

$$\tau_i^0 - \tau_i^{*0} = \left(-\frac{I_{iL} - \alpha_L}{a + \alpha_L} \frac{y_i}{\pi_i M_i'} \right) - \left(-\frac{I_{iL}^* - \alpha_L^*}{a^* + \alpha_L^*} \frac{y_i^*}{\pi_i M_i^{*\prime}} \right) \text{ for } i = 1, 2, ..., n$$

- Relative to free trade, the negotiated trade agreement favors the industry group that has greater political clout.
- $\frac{\tau_i}{\tau_i^*} > 1$ when first term exceeds the second term
- $\frac{\tau_i}{\tau_i^*} < 1$ when second term exceeds the first term

Political Power and Inefficiency

1. Measurements of political power:
   - Representation in the political process
   - The power of group in the negotiation
   - Weight on average welfare
   - Political advantage relative to its foreign counterpart
   - Price sensitivity

2. Whatever aggregate efficiency losses result from the negotiated trade agreement, they stem not from the mere existence of special-interest politics in the two countries, but from differences in the extent of the political pressures that the interest groups can bring to bear.

3. The foreign trade elasticities are neglected by the hypothetical mediator of the trade agreement as their derivation illustrates. That is, an efficient negotiation will eliminate this source of deadweight loss while perhaps compensating the party that otherwise would have captured the benefits.

Division of Surplus

- The cost of delay consists of two parts: 1) non-cooperative equilibrium and 2) risk that talks will come to an end.
- Each government captures more of the gains from cooperation the greater its measure of political welfare in the trade war equilibrium.
- Higher welfare in the status quo ante gives a negotiator a stronger position at the bargaining table.
- Each government also gains more from the trade agreement the more patient it can be while bargaining.
- Patience gives a negotiator a credible threat to decline a low offer, and thus her rival must offer more to ensure an agreement without delay.

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- When both are equally strong, their political influences will cancel, and international prices under a trade agreement should be equal to chose that would prevail under totally free trade.
- For lobby groups, they must compete with counterparts in the foreign country to benefit from trade policies.
- For government officials, they need to consider political cost when maximizing their own benefits.