

Selective Promotion of Industries and Picking Winners

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1 LITERATURE

- Brander and Spencer (1985) show export subsidies can increase national welfare by shifting profits from foreign to domestic firms in Cournot oligopolies.
- Dixit and Grossman (1986) demonstrate that a uniform subsidy to all industries promotes none and merely bids the price of the common fixed factor higher by the amount of the subsidy.
- To raise domestic welfare, the government must target the industries with the greatest profit-shifting potential per unit of the common fixed factor.
- Governments may experience difficulty in identifying which industries to target due to lack of information.

- Grossman and Helpman (1994) study the role of contingent contributions in influencing the choice of trade policy under perfect competition, where free trade is optimal.
- Can lobbying contributions reveal profit-shifting potential and thus permit the government to tailor export subsidies across industries despite lack of knowledge of relevant parameters?
- Each industry offers an implicit contribution schedule, offering donations contingent on the government's chosen allocation of export subsidies.
- Industry lobbying permits the government to properly select the subsidy level for each industry that maximizes overall domestic welfare.
- The lobbying equilibrium implements the allocation of targeted subsidies described by Dixit and Grossman (1986) that maximizes domestic welfare.

2 SETUP

- Similar to Dixit and Grossman but with cost of foreign rival the only difference across industries for simplicity.
- Continuum of high-tech industries $i \in [0, 1]$ that are Cournot duopolies (Dixit and Grossman have discrete number of industries n).
- Output of a domestic firm y_i and output of a foreign firm Y_i .
- A numeraire industry that is perfectly competitive.
- Two factors, scientists and workers, available in fixed supplies k and l . No factor constraints abroad.

- High-tech goods use one scientist and $a_i = a$ units of workers (Dixit and Grossman allow industries to differ in the number of workers needed per scientist).
- Numeraire good uses one unit of workers. Output of numeraire good based on labor not used to produce high-tech goods $x = l - a \int_0^1 y_i di$.
- Normalize the price of the numeraire good to be one.
- Scientific wage z , workers wage 1. These wages are taken as given by firms.
- Marginal cost of domestic production $c = a + z$ (cost of domestic firms varies in Dixit and Grossman due to differences in number of workers used).
- Marginal cost of foreign production C_i , with average $\tilde{C} \equiv \int_0^1 C_i di$.

- Specific domestic export subsidy s_i , with average $\tilde{s} \equiv \int_0^1 s_i di$.
- Foreign government is not policy active.
- No domestic consumption of high-tech goods.

3 MODEL OF INDUSTRIES

- Domestic profits = (price plus subsidy minus cost) times output

$$\pi_i = [p_i + s_i - a - z] y_i$$

- Domestic inverse demand function linear with domestic and foreign products imperfect substitutes ($\kappa > 0, \tau > 0$)

$$p_i = b - \tau y_i - \kappa Y_i$$

- Domestic first order condition (pick domestic output y_i to maximize domestic profits π_i taking foreign output Y_i as given)

$$\frac{\partial \pi_i}{\partial y_i} = b - 2\tau y_i - \kappa Y_i + s_i - a - z = 0$$

- Domestic reaction function (solve FOC for domestic output y_i in terms of foreign output Y_i)

$$y_i = \frac{b + s_i - a - z - \kappa Y_i}{2\tau}$$

- Subsidy shifts out domestic reaction function so that domestic firm produces higher output y_i for any given level of Y_i .

- Foreign profits

$$\Pi_i = [P_i - C_i] Y_i$$

- Foreign inverse demand ($\tau > 0, (\tau T - \kappa^2) > 0$)

$$P_i = b - TY_i - \kappa y_i$$

- Foreign first order condition

$$\frac{\partial \Pi_i}{\partial Y_i} = b - 2TY_i - \kappa y_i - C_i = 0$$

- Foreign reaction function

$$Y_i = \frac{b - C_i - \kappa y_i}{2T}$$

- Equilibrium outputs (found by solving two FOCs, intersection of two reaction functions)

$$y_i = \frac{2T(b + s_i - a - z) - \kappa(b - C_i)}{4\tau T - \kappa^2}$$

$$Y_i = \frac{2\tau(b - C) - \kappa(b + s_i - a - z)}{4\tau T - \kappa^2}$$

- Subsidy causes domestic output to expand and foreign output to contract.
- Substitute equilibrium outputs into domestic profits to find equilibrium profits.

- Profit shifting effect

$$\frac{\partial \pi_i}{\partial s_i} = \frac{4\tau T (b + s_i - a - z) - \kappa (b - C_i)}{(4\tau T - \kappa^2)^2} > 0$$

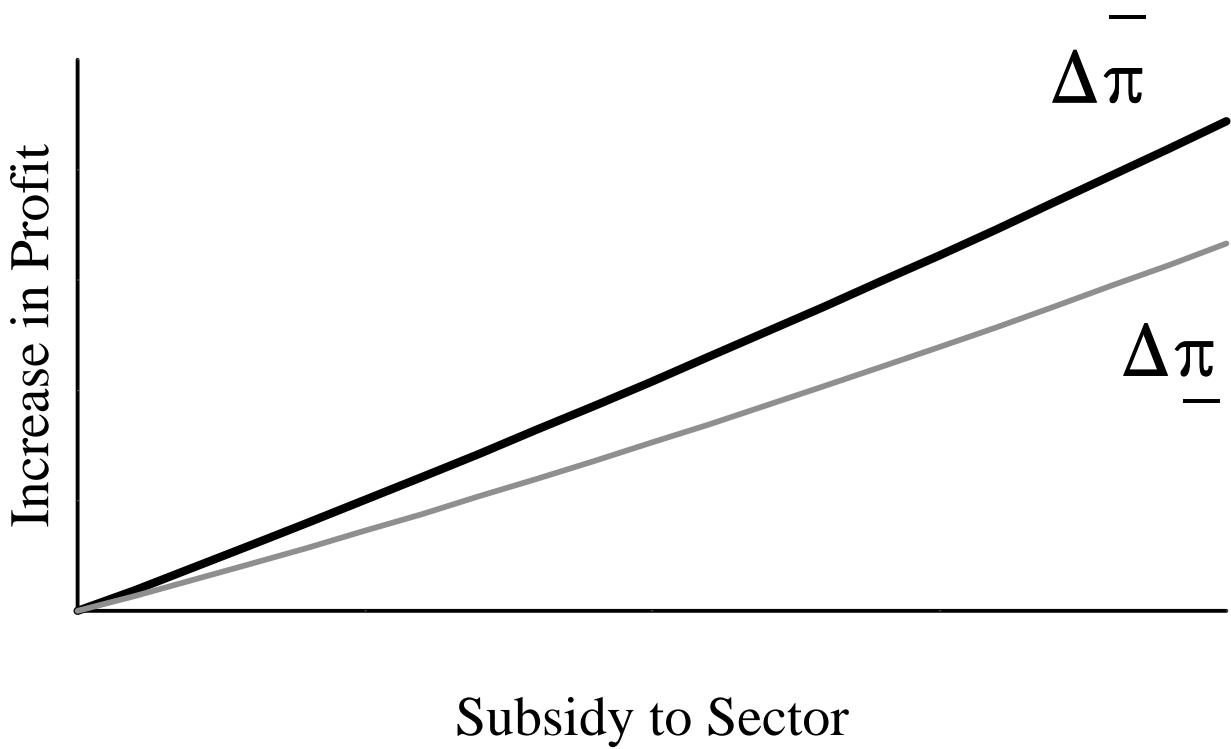
bigger when foreign firm's costs bigger

$$\frac{\partial^2 \pi_i}{\partial s_i \partial C_i} = \frac{4\kappa\tau T}{(4\tau T - \kappa^2)^2} > 0$$

- Figure 1 shows how equilibrium domestic profits varies by amount of subsidy. A larger subsidy generates a larger increase in domestic profits. The increase in profits is largest for the firm with the highest cost foreign rival (the biggest winner) and smallest for the firm with the lowest cost foreign rival (the biggest loser).
- Domestic resource constraint (plug equilibrium domestic output into $\int_0^1 y_i di = k$)

$$2T (b + \tilde{s} - a - z) - \kappa (b - \tilde{C}) = k (4\tau T - \kappa^2)$$

Figure 1: Increase in Profit of Domestic Firm due to Subsidy



- Equilibrium scientific wage (level of z that makes demand for scientists equal the fixed supply k)

$$z = b + \tilde{s} - a - \frac{\kappa (b - \tilde{C}) + k (4\tau T - \kappa^2)}{2T}$$

- Domestic welfare with no domestic consumption (factor income plus total industry profits net of subsidy payments)

$$w = l + zk + \int_0^1 (\pi_i - s_i y_i) di$$

- Optimal subsidies (solve $\partial w / \partial s_i = 0$ for s_i) are larger for industries with higher cost foreign rivals

$$s_i - \tilde{s} = \frac{\kappa^3}{4\tau T - \kappa^2} (C_i - \tilde{C}) > 0 \iff C_i > \tilde{C}$$

- Unlikely government would know how $C_i - \tilde{C}$ varies by industry (or the parameters of demand); however, each firm may have a solid sense of how its profits π_i might be affected by various subsidy levels s_i .

4 LOBBYING IMPLEMENTATION

- Use lobbying framework similar to Grossman and Helpman (1994) "Protection for Sale" to implement export subsidy scheme – Promotion for Sale here.
- Total subsidy payments

$$t = \int_0^1 s_i y_i di$$

- Lobby welfare (lobby owns one high tech firm and a representative share f_i of factor income with subsidy payments taxed lump sum)

$$W_i = f_i (l + zk - t) + \pi_i$$

- Net of contributions

$$V_i(s_i) = W_i(s_i) - \chi_i(s_i) \geq 0$$

- Effect on lobby welfare

$$\frac{\partial W_i}{\partial s_i} = f_i \left(k \frac{\partial z}{\partial s_i} + \frac{\partial t}{\partial s_i} \right) + \frac{\partial \pi_i}{\partial s_i}$$

- Contributions truthfully reveal gains

$$\frac{\partial \chi_i}{\partial s_i} = \frac{\partial W_i}{\partial s_i}$$

- Government's FOC to maximize total contributions (solves $\partial \chi / \partial s_i = 0$ where $\chi = \int_0^1 \chi_i di$ and $\int_0^1 f_i di = 1$)

$$\int_0^1 \frac{\partial \pi_i}{\partial s_j} di = k \frac{\partial z}{\partial s_j} + \frac{\partial t}{\partial s_j} \forall j \in [0, 1]$$

has same solution as condition for maximizing domestic welfare w so the optimal subsidies are chosen.

5 POSSIBLE EXTENSIONS

- Under Bertrand competition, will the industries with greatest profit shifting potential from increase in export tax offer smaller reduction in contribution when their own tax increased?
- What if some industries play Cournot while some play Bertrand - can contributions be used to sort out which need subsidies versus taxes?
- What if some consumption occurs in home country - will consumer's interests be represented?
- Would free entry into industries change results?
- What distortions introduced in not all industries are organized as lobbies?

- If lobby formation is endogenous, will all lobbies form? Will the "right" lobbies form first (ones with largest profit shifting potential)?
- What if a lobbying is not a pure transfer of contributions to the government but involves waste?
- What if some industries more efficient at lobbying than others (better able to raise funds for contributions)?
- What if there is a social cost of raising funds needed to pay for subsidies?

6 SUMMARY

- Lobbying may reduce the informational burden facing governments trying to target industries that share a common fixed factor.
- Export subsidies can raise national welfare despite the government not knowing the profit-shifting potential of each industry.
- Rational lobbying equates the cost of lobbying with the benefits and thus reveals useful information about profit shifting potential.
- Rent-seeking behavior can guide the government towards an allocation of subsidies across industries that raises domestic welfare.