

**Lecture 27**  
**Economics 181**  
**International Trade**

**I. Introduction to Strategic Trade Policy**

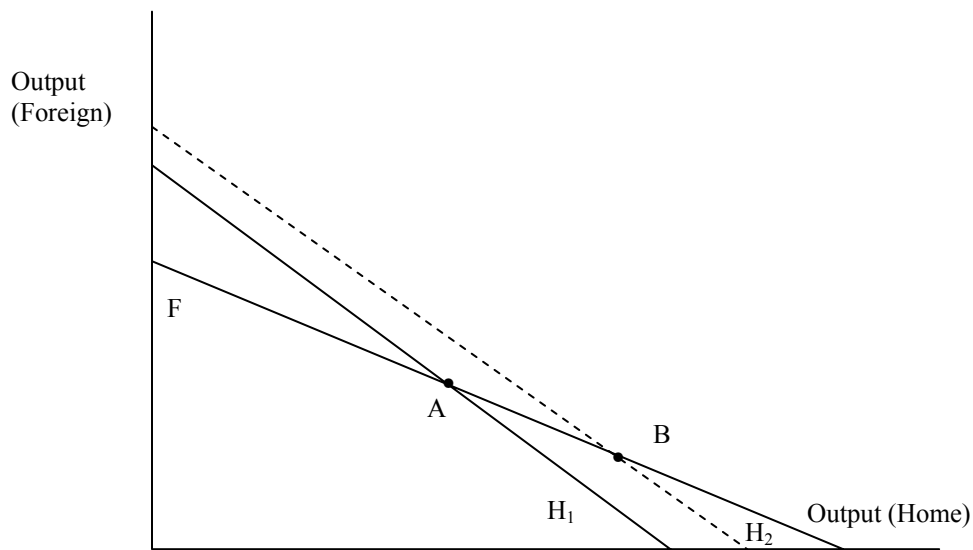
If much of world trade is in differentiated products (ie manufactures) characterized by increasing returns to scale, the government could become an important player. Strategic Trade Policy (STP) is defined as government policy which attempts to shift excess profits in an oligopolistic international markets towards the home country firms. These policies typically would take the form of subsidies, such as outright grants, loans at lower-than-market interest rates, promises to purchase a large volume of production, etc. However, the aid could also be more innovative--such as setting industry standards to benefit your home country firms (as in HDTV).

How does STP work? In a market with only several players and positive profits, each firm would like to expand market share at the other's expense. But if the other firm produces more, you have an incentive to produce less--otherwise, production on average will increase, leading to lower prices and lower profits. To describe this inverse relationship between your production and your competitor's production, we can draw "reaction" functions for the home (H) and foreign (F) firm. You can think of these as Boeing versus Airbus.

These functions slope downwards because the more you produce, the less your competitor produces, and vice versa. Intuitively, if your competitor expands capacity in a market with a limited demand, you will sell less, not more, to maintain prices (and profits).

The equilibrium is where the two curves intersect. Ideally, you would prefer to be at point B, where F (Airbus) produces less and you produce more. But your competitor knows this is not credible given your cost structure. How can you make your threat to grab market share and produce more (forcing F to produce less) a credible threat? The answer is you can't--but the government can, by subsidizing you and lowering your costs.

The subsidy in effect changes the rules of the game, moving you to H2 at the new intersection B.



What has to be true for this policy to work?

- (1) International Oligopolies--ie few players. This implies barriers to entry, excess profits.
- (2) First mover advantages.
- (3) Lack of retaliation.
- (4) Enough information to target the correct industries--what if you cannot be competitive even with the subsidy? (Airbus)

So when would you want to use strategic trade policy?

- (1) for profit shifting

(2) As retaliation in a "tit" for "tat" strategy. An economist asked individuals to submit strategies for a prisoner's dilemma type of game, then used a computer to figure out the winning strategy. The winning strategy every time was tit for tat: you cooperate in the first round of the game, then do whatever your rival does in the next move (ie cooperate if he/she does, play nasty if he/she does too). This suggests that strategies where you cooperate if your rival cooperates and then quickly but briefly punish non-cooperative behavior are remarkably successful.

Why not do it?

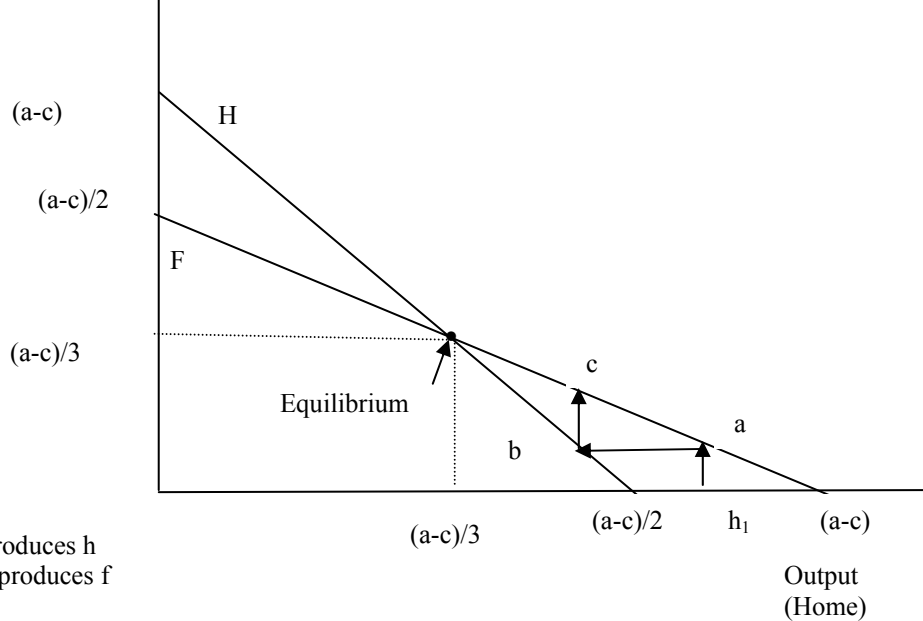
- (1) huge informational requirements
- (2) retaliation a problem, especially in a multilateral world
- (3) this is a beggar thy neighbor policy
- (4) Political economy problems: don't end up protecting the right industries. In principle, you want to help winners instead of losers.
- (5) How can you tell what is tit for tat? Japan responds to the US, who responds to Japan, etc.

One aside: what is the difference between industrial policy and STP? Strategic trade policy is a very distinct type of industrial policy which is concerned with shifting profits away from foreign competitors in an oligopolistic market. Industrial policies--which can be broadly defined as any policy to help domestic industry--can take a variety of forms.

## II. An example of Strategic Trade Policy.

Boeing versus Airbus. Since the 1970s, the aircraft industry has been at the center stage of many trade disputes between the European community as a result of the subsidies that the European Community has given to Airbus. The US trade representatives claim that the subsidies have helped Airbus increase its market share at the expense of the US producers. The latest chapters in this story was Boeing's merger with McDonnell Douglas. The sticking point (as least as far as the Europeans were concerned) were the exclusive 20 year supply agreements which Boeing had signed with 3 US airlines.

## III. A Numerical Example (OPTIONAL)



Home produces  $h$   
Foreign produces  $f$

Demand is given by:  $P_d = a - (h + f)$

Each duopolist has the same marginal costs (for simplicity), given by  $c$ :

So total costs for  $h$  are given by  $ch$  and for  $f$  are given by  $cf$

(Implies constant marginal costs, but we could add fixed costs if we wanted)

So each duopolist maximizes the following profit function:

$$\text{Max } \Pi_h = \text{Revenues} - \text{costs} = P_d * h - ch = [a - (h+f)]h - ch \text{ over } h$$

$$\text{Max } \Pi_f = \text{Revenues} - \text{costs} = P_d * f - cf = [a - (h+f)]f - cf \text{ over } f$$

So first order conditions yield:

$$\partial \Pi / \partial h = a - 2h - f - c = 0$$

So we can derive  $h$  as a function of  $f$ :

$$h = (a-c)/2 - 1/2f = R_h(f). \text{ Note that the slope is negative.}$$

$$f = (a-c)/2 - 1/2h = R_f(h). \text{ Note that the slope is negative.}$$

The graph is a visual representation of the two reaction functions,  $R_h$  and  $R_f$ .

As we can see, both home and foreign's output are a negative function of each other.

BUT

Equilibrium is defined as a pair of outputs  $(h, f)$  that are mutually consistent in terms of the two reaction functions. So  $(h^*, f^*)$  is a Cournot equilibrium if  $h^* = R_h(f^*)$  and if  $f^* = R_f(h^*)$ . One has two equations in two unknowns and one can solve for  $h$  and  $f$  to get:

$$h^* = f^* = (a-c)/3$$

$$\text{So the total market} = 2(a-c)/3$$

What would be the perfectly competitive output?

$$\text{We would set } P_d = a - (f+h) = MC = c$$

$$\text{So } f + g = (a-c)$$

So in our duopoly, output is  $2/3$  what it would be under perfect competition.

What would be the monopoly output?

Monopolists set  $MR = MC$ . We know  $MC = c$ . What is  $MR$ ?

$$MR = \partial \text{Revenues} / \partial q \text{ where } q = h + f$$

$$\text{But Revenues} = P \cdot q = [a - q] \cdot q = aq - q^2$$

$$\partial (P \cdot q) / \partial q = a - 2q \quad \text{So } MC = MR \Rightarrow$$

$$c = a - 2q \quad \Rightarrow \quad q = f + h = (a-c)/2$$

So under a monopoly, output is  $1/2$  of the perfectly competitive solution.

So the math helps explain why each of the reaction functions slope downwards. But why don't we end up where we want—producing everything while our competitor produces nothing? We know we'll never produce more than the competitive amount:  $(a-c)$ . We also know we'll never produce less than the monopoly amount:  $(a-c)/2$ . So let's say we start out saying we'll produce at  $h_1$ . Why isn't this possible?

The answer is: it is not an equilibrium. If we produce there, our opponent will want to produce at  $a$ , which is still rational since the sum of his output and your output is less than or equal to the competitive equilibrium. But if he produces at  $a$ , then you have to revise your output downwards because initially you expected him to produce nothing. So you will move to point  $b$ . At  $b$  (less than your initial  $h$ ) your opponent has an incentive to raise output to  $c$ ...and so on, until you reach equilibrium.

#### IV. The Prisoner's Dilemma

The problem is that if we engage in strategic trade policy and subsidize or protect our firms (and end up at point  $B$  in the first diagram), then the rival government may do the same (shifting its home firm reaction function out too), and both countries are worse off. This is illustrated by the prisoner's dilemma. The prisoner's dilemma explains why we're probably better off if we can cooperate, and not induce high subsidy costs by rival governments, yet we don't always see cooperation in the "real world".

EC		Co-operate	Don't co-operate
US			
Co-operate		10	20
		10	-10
Don't cooperate		-10	-5
		20	-5

Solution? Try to enforce cooperation. One good mechanism: cooperate initially, if rival cheats, punish by not cooperating, then go back to cooperation.