

Chapter 3

Oligopolistic models of trade

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1. International oligopoly

Why do countries trade?

... well, countries do not trade, firms do

3. International oligopoly

Brander (1981) exposed a simple and straightforward intuition to explain the existence of trade across borders:

- Strategic interaction between firms is sufficient to explain intra-industry trade in the absence of product differentiation

3. International oligopoly

Assume an international oligopoly

- In each of the two countries, we define:
 - Cost function: $C(q) = F + cq$
 - Transport cost (iceberg): only a fraction $g < 1$ of the shipment arrives at destination
 - Utility: $U(X) = aX - \frac{bX^2}{2}$
 - So that inverse demand is $p(X) = U'(X) = a - bX$

3. International oligopoly

Total demand in each country:

$$X = x + gy$$

$$V = v + gu$$

- X = consumption in country A, x = sales of A firm, y = sales of B firm (imports)
- V = consumption in country B, v = sales of B firm, u = sales of A firm (imports)

3. International oligopoly

Firms maximize their profits taking as given the output supplied by their competitor (Cournot)

- Firm A:

$$\max P(x + gy)(x) + P(v + gu)(gu) - C(x + u)$$

- Firm B:

$$\max P(x + gy)(gy) + P(v + gu)(v) - C(y + v)$$

3. International oligopoly

Considering that markets are segmented, we can consider that each firm maximize its profit on each market.

For market A, f.o.c. are:

$$\text{– Firm A: } x = \frac{a - c - bgy}{2b}$$

$$\text{– Firm B: } y = \frac{ag - c - xbg}{2bg^2}$$

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Reaction function give the equilibrium quantities (for market A here):

$$x^* = \frac{ga + c - 2gc}{3gb} ; y^* = \frac{ga + gc - 2c}{3g^2 b}$$

Check that $\frac{\partial x^*}{\partial g} < 0$; $\frac{\partial gy^*}{\partial g} > 0$; $x > gy^*$

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We do not observe imports if:

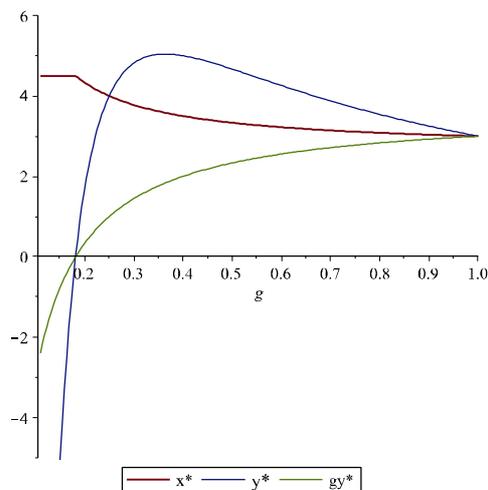
$$g < 2c/(a+c)$$

NB. trade may never exist if c is very large compared to a such that $2c/(a+c) > 1$

In this case, firm A is a monopoly and $x^{*Monop} = \frac{a-c}{2b}$

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With $a=1$; $c=0.1$; $B=0.1$



3. International oligopoly

- Segmented markets: x and v are independent
 - Total sales:

$$X^* = x^* + gy^* = \frac{ga + c - 2gc}{3gb} + g \frac{ga + gc - 2c}{3g^2b}$$

$$= \frac{2a - \frac{(1+g)c}{g}}{3b}$$

– Price: $p^* = a - bX^* = \frac{a + \frac{(1+g)c}{g}}{3}$

3. International oligopoly

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Lower transport costs implies:

- Larger imports, lower domestic sales
- lower prices (pro-competitive effect)

Moving from autarky, i.e. $g < 2c/(a+c)$, to costly trade, i.e. $2c/(a+c) < g < 1$, reduces the price and increases consumers' welfare

However, trade cost is a net loss

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The net loss induced by the trade cost is the difference between the production and the consumption of imported good

$$(1-g)y$$

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Trade has a **pro-competitive effect**: p decrease as g increase

Firms take a lower mark-up over marginal cost when they export (cost on y units, but revenues on gy)

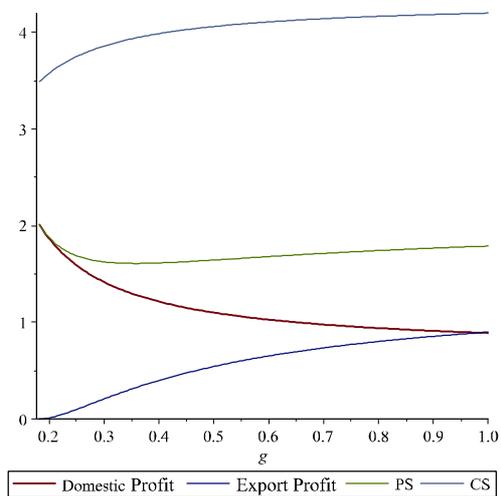
- **Reciprocal dumping**
- **Producers do not pass all the transport cost into the prices = incomplete pass-through**

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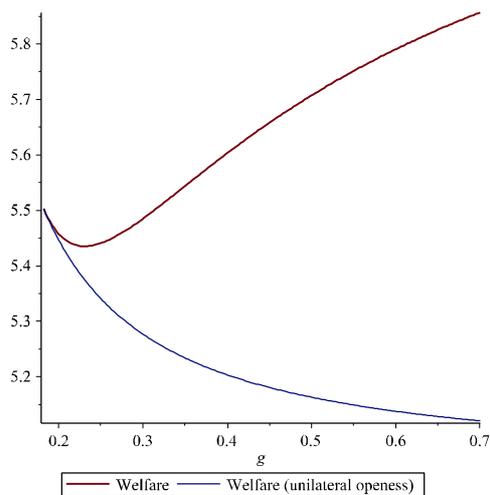
Welfare gains:

- Trade-off:
 - Lower prices and higher consumption (pro-competitive effect)
 - Cross-hauling (transport cost, g , is a net loss = waste)
- Decompose consumer and producer surplus:
 - Consumers unambiguously benefit from increased in competition
 - Producers: sum of their profits abroad and at home. At high levels: a decrease in trade costs decreases more their profit at home than it increases abroad. The opposite is true at low levels.

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- Extensions:
 1. Product differentiation: an extra gain from trade... but the main message from Brander remains that a strategic behavior is a sufficient rationale for intra-industry trade.
 2. Trade costs are tariffs: revenue is collected by governments. Welfare increases unambiguously. (see Leahy - Neary, 2010)
 3. Many oligopolists in each country, governed by a free-entry condition: social welfare increases. (Brander – Krugman, 1983).