

## International Economics

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### Problem Set 3 - Monopolistic Competition

#### Exercise 1:

New trade theories of trade made a substantial step toward reality (compared to the classic theories discussed in the past problem sets). Among the most relevant, we have the possibility for countries to engage in international trade even in absence of a comparative advantage (in terms of either production or resources).

- a. Describe the major differences between *OLD* and *NEW* trade theory.
  - Assumptions
  - Outcomes
- b. What are the implications of trade for firm size and number?
- c. What are the (theoretical) distributional impacts from intra-industry trade?

#### Solution:

[DISCUSSED IN CLASS, SEE SLIDE 40 FROM LECTURE N.6]

#### Exercise 2: Measuring Intra-Industry Trade

Consider Barduba, a hypothetical tropical country producing just 3 goods (all of which are eventually traded). Its import/export pattern is reported in the table below

Good	Exports	Imports
Phosphates	1000	100
Spices	150	80
Vegetable Oil	300	400

- a. What index captures the extent of intra-industry trade (IIT)?

#### Solution:

There are more indices: the Gruber-Lloyd index and the Vona indices are the two most widely adopted. The GL index defines IIT in terms of the balanced two-way trade in goods produced in the same industry. The V index defines IIT as the two-way flows of goods produced by the same industry, independently of their balance.

b. Compute the GL index for Barduba.

**Solution:**

The GL index formula is

$$GL_{ijk} = \frac{\sum_{k=1}^n (x_{ijk} - m_{ijk}) - \sum_{k=1}^n |x_{ijk} - m_{ijk}|}{\sum_{k=1}^n (x_{ijk} - m_{ijk})} = 1 - \frac{|x_{ijk} - m_{ijk}|}{(x_{ijk} - m_{ijk})}$$

The GL index can then be computed as follows:

$$GL_{phosph} = 1 - \frac{|1000-100|+|150-80|+|300-400|}{(1000+100)+(150+80)+(300+400)} = 1 - \frac{1070}{2030}$$

$$= 1 - 0.53 = 0.47$$

c. Interpret the index: what can you say about Barduba?

**Solution:**

GL varies between 0 and 1. The closer a country's GL is to 1, the higher is its intra-industry trade. Should be noticed that, empirically speaking, the value of GL for a country depends on the level of aggregation of the data (the higher the detail, the lesser the intra-industry trade).

### Exercise 3: Monopolistic Competition and Trade

Assume two countries: Home and Foreign. None of them has a particular advantage in terms of factor endowment. Also, both countries have access to similar technology.

a. According to Old trade theory, what would be the result of trade? Why?

**Solution:**

Neither in Ricardo nor in H-O there would be any room for trade, as no country would gain from doing so: prices would remain be the same, without any gain in termr of quantity produced.

b. Assume the following setting:

$F$	$=$	<i>FixedCosts</i>	$=$	750,000,000US\$
$S_h$	$=$	<i>Homemarketsize</i>	$=$	900,000units
$S_f$	$=$	<i>Foreignmarketsize</i>	$=$	1,600,000units
$S_{f2}$	$=$	<i>ThirdCountryMarketsize</i>	$=$	3,750,000units
$c$	$=$	<i>MarginalCost</i>	$=$	5,000US\$
$\beta$	$=$	<i>Firm'sMarketSensibilitytoprice</i>	$=$	1/30,000

Determine  $n$ ,  $Q$ ,  $\bar{p}$

**Solution:**

From the extension of monopoly framework, we know that we first have to find the number of firms operating in equilibrium in the aggregate market. This can only be done by setting  $p = AC$ . We know that  $AC = (n \times F/S) + c$  and  $p = c + 1/(\beta \times n)$ . Thus,

$$\frac{n \times F}{S} + c = c + \frac{1}{\beta \times n}$$

We can use the aggregate market size  $S$ , which equals 6,250,000 units (900,000+1,600,000+3,750,000), to solve for  $n$

$$n = \left( \frac{30,000 \times 6,250,000}{750,000,000} \right)^{1/2} = 15.8$$

We can now identify  $Q$  and  $p$  as

$$\begin{aligned} Q &= S/n = 6,250,000/15 = 416,667 \text{ units} \\ P &= c + 1/(\beta \times n) = 5,000/30,000/15 = 7,000 \text{ US\$} \end{aligned}$$

Notice that, as  $n$  must be integer, in this case we will preserve a positive margin  $\pi$ . Such margin is large enough to allow for a profit to the firms in the market, but small enough (at the current conditions) to discourage additional firms from entering the market.

- c. **What would happen if one more firms step into the market, attracted by the extra-profit  $\pi$ ?**

**Solution:**

Even one extra firm would push the market too far: profits would turn into losses, and one firm would eventually have to drop off the market.