INTERNATIONAL DUOPOLY AND RECIPROCAL DUMPING

Economics of European Integration, Marius Brülhart

Assume a single homogeneous good x, a single production factor L and two identical countries $i = \{H, F\}$.

Demand in each country is given by an isoelastic function:

$$x_i = \frac{1}{2} p_i^{-\frac{1}{\varepsilon}}, \ 0 < \varepsilon < 1, \ \sigma = \frac{1}{\varepsilon}. \tag{1}$$

σ is the absolute value of the price elasticity of demand for x.

There is a monopoly firm in each country. Both firms have identical production technologies featuring a fixed cost f and a constant marginal cost c. Total cost functions are thus given by:

$$TC_{x_i} = f + cx_i.$$

In **autarky**, each firm only sells on the domestic market, maximising the following profit function:

$$\pi_{x_i} = p_i x_i - cx_i - f.$$

Profits are maximised where MR equals MC. MR is:

$$\begin{aligned} \mathrm{MR}_{x_i} &= \frac{\partial (p_i x_i)}{\partial x_i} = \frac{p_i \partial x_i + x_i \partial p_i}{\partial x_i} = p_i + x_i \frac{\partial p_i}{\partial x_i} \\ &= p_i + \frac{x_i p_i}{p_i} \frac{\partial p_i}{\partial x_i} = p_i \left(1 + \frac{\partial p_i / p_i}{\partial x_i / x_i} \right) \\ &= p_i \left(1 - \frac{1}{\sigma} \right) = p_i (1 - \varepsilon) \end{aligned} \tag{2}$$

Hence, choose x_i so as to satisfy:

$$\mathrm{MR}_{x_i} = p_i(1 - \varepsilon) = c = \mathrm{MC}_{x_i},$$

so that:

$$p_i = \left(\frac{1}{1 - \varepsilon} \right) c.$$

Therefore, price exceeds MC by a factor $1/(1 - \varepsilon)$.

With perfectly **free trade** among H and F, demand becomes:

$$x = p^{-\frac{1}{\varepsilon}}, \tag{3}$$

where:

$$x = x_H + x_F = \frac{1}{2} p_H^{-\frac{1}{\varepsilon}} + \frac{1}{2} p_F^{-\frac{1}{\varepsilon}}.$$

Assume Cournot competition among the two firms in the integrated market. That means that each firm chooses its profit-maximising x_i assuming that the output of the other firm will remain unchanged. The profit function of each firm is now given by:

$$\pi_{x_i} = p x_i - c x_i - f,$$

or, substituting from eq.(3):

$$\pi_{x_i} = x^{-\varepsilon} x_i - c x_i - f.$$

Profits are maximised where *perceived* MR equals MC. Assuming an integrated world market (consisting of the two countries), and remembering eq. (2), we have that $\text{MR}_x = p + x\frac{\partial p}{\partial x}$, so that

$$MR_{x_i} = p + x_i \frac{\partial p}{\partial x} \frac{\partial x}{\partial x_i}. \tag{4}$$

With Cournot conjectures, firms assume $\frac{\partial x}{\partial x_i} = 1$. If we multiply the r.h.s. of eq. (4) by $\frac{x}{x}$ and by $\frac{p}{p}$, we find the profit-maximising condition:

$$p\left(1 - \varepsilon \frac{x_i}{x}\right) = c,$$

which, given perfect symmetry between firms, becomes:

$$p\left(1 - \frac{\varepsilon}{2}\right) = c.$$

Since $1/(1-\varepsilon/2) < 1/(1-\varepsilon)$, the monopoly mark-up is lower with free trade than in autarky. This can be achieved even without any trade occurring!

Assume now that even after abolition of visible trade barriers among H and F, some **trade costs** t per unit of output remain. Assume also that the monopoly price in autarky is higher than $c + t$. In this setting, the MC of the domestic supplier is no longer equal to that of the exporter, and hence their equilibrium conditions are no longer identical. A home firm's profit maximisation rule is:

$$p\left(1 - \varepsilon \left[\frac{x_{HH}}{x_{HH} + x_{FH}}\right]\right) = c;$$

while that of a foreign firm is:

$$p\left(1-\varepsilon\left[\frac{x_{FH}}{x_{HH}+x_{FH}}\right]\right)=c+t,$$

where x_{FH} is the quantity produced in F and sold in H.

Due to the home firm's cost advantage in H, market shares are no longer identical:

$$\frac{x_{FH}}{x_{HH}+x_{FH}}<\frac{1}{2}<\frac{x_{HH}}{x_{HH}+x_{FH}}.$$

In this setting, producers have an incentive to penetrate the market of the foreign country by setting export prices (net of t) that are lower than prices on the home market. This is because perceived MR from foreign sales is relatively high. Exporting therefore takes place whenever it yields a perceived MR that is higher than $c+t$. This leads to intra-industry trade ("reciprocal dumping").