A SIMPLE MODEL OF HORIZONTAL FDI

Economics of European Integration, Marius Brülhart

Assume a …rm with an international monopoly for the good it produces (e.g. through patent protection). There are two countries, H and P, and demand in each country can be described with the same isoelastic demand function:

$$P_i = L_i^{"} Q_i^{i\,"}; \quad 0 < " < 1;$$

$$Q_i = L_i P_i^{i\,\frac{1}{"}}: \tag{1}$$

where $i \; 2 \; fH; Pg$, L is population size and Q is the quantity sold. We assume that country H is bigger than country P, i.e. $L_H > L_P$.

The …rm can produce with a per-plant …xed cost of f (hence with increasing returns to plant scale) and a marginal cost c_i. We assume that the marginal production cost is higher in country H than in country P, i.e. $c_H > c_P$, while the …xed cost is the same in both countries. We also assume that the overall cost-revenue con…guration is such that the …rm …nds it pro…table to produce.

(Note the analogy between the EU's centre and periphery and countries H and P, given that H has a bigger market and P has lower production costs.)

Trade between the two countries is costly. Speci…cally, the cost of sending one unit of the good from one country to the other is t.

The …rm has three strategies:

A: produce in H and P for the local markets

B: produce in H and export to P

C: produce in P and export to H

Given the demand function (1), marginal revenue is given by:

$$M R_i = P_i(1 \; ¡ \; "):$$

The …rm maximises pro…ts in each market by choosing output levels such that $MR_i = c_i$. Marginal costs for the three strategies are:

A: $\{c_H; c_P\}$

B: $\{c_H; (c_H + t)\}$

C: $\{(c_P + t); c_P\}$

As an example, compute the …rm's pro…t if it decides to serve market H from a production plant in H (i.e. it adopts strategy A or B). We then have:

$$P_H(1 - \varepsilon) = c_H;$$

$$P_H = c_H(1 - \varepsilon)^{-1}:$$

Substituting in (1), we obtain:

$$Q_H = L_H c_H^{-\varepsilon}(1 - \varepsilon)^{\varepsilon}:$$

Variable pro…t (not considering …xed costs) is given by:

$$\pi_H = (P_H - c_H)Q_H = c_H\varepsilon(1 - \varepsilon)^{-1}Q_H;$$

$$\pi_H = \varepsilon(1 - \varepsilon)^{(\varepsilon - 1)}L_H c_H^{(1-\varepsilon)};$$

$$\pi_H = \gamma\left[L_H c_H^{(1-\varepsilon)}\right]; \gamma = \varepsilon(1 - \varepsilon)^{(\varepsilon - 1)}:$$

Hence, total pro…ts for the three strategies are as follows:

A: $\pi^A = \gamma\left[L_H c_H^{(1-\varepsilon)} + L_P c_P^{(1-\varepsilon)}\right] - 2f$

B: $\pi^B = \gamma\left[L_H c_H^{(1-\varepsilon)} + L_P (c_H + t)^{(1-\varepsilon)}\right] - f$

C: $\pi^C = \gamma\left[L_H (c_P + t)^{(1-\varepsilon)} + L_P c_P^{(1-\varepsilon)}\right] - f$

The location decision of this (potential) multinational …rm is thus a function of market size, location-speci…c costs plant-speci…c …xed costs and trade costs. As trade costs t are lowered, the dominant strategy is likely to move from A to B to C.