A SIMPLE MODEL OF HORIZONTAL FDI
Economics of European Integration, Marius Brülhart

Assume a firm 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:

\[ P_i = L_i^\beta Q_i^{1-\beta}; \ 0 < \beta < 1; \]

\[ Q_i = L_i (P_i^{1-\beta}) \tag{1} \]

where \( i \in \{H, P\} \), \( L \) 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 firm can produce with a per-plant fixed 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 fixed cost is the same in both countries. We also assume that the overall cost-revenue configuration is such that the firm finds it profitable 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. Specifically, the cost of sending one unit of the good from one country to the other is \( t \).

The firm 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:

\[ M R_i = P_i (1 - \beta); \]
The firm maximises profits in each market by choosing output levels such that \( MR_i = c_i \). Marginal costs for the three strategies are:

A: \( f c_H; c_P g \)
B: \( f c_H ; (c_H + t) g \)
C: \( f (c_P + t) ; c_P g \)

As an example, compute the firm’s profit if it decides to serve market \( H \) from a production plant in \( H \) (i.e. it adopts strategy A or B). We then have:

\[
P_H(1 \cdot i') = c_H;
\]

\[
P_H = c_H(1 \cdot i') + 1;
\]

Substituting in (1), we obtain:

\[
Q_H = \mu H c^\frac{1}{\alpha} (1 \cdot i')^\frac{2}{\alpha}:
\]

Variable profit (not considering fixed costs) is given by:

\[
\nu_H = (P_H \cdot i \cdot c_H)Q_H = c_H'(1 \cdot i') + 1Q_H:
\]

\[
\nu_H = "(1 \cdot i')(1 + i')L_H (1 + 0)^{i'};
\]

\[
\nu_H = \cdot L_H (1 + 0)^{i'}: = "(1 \cdot i')(1 + i'):
\]

Hence, total profits for the three strategies are as follows:

A: \( \nu_A = \cdot L_H (1 + 0)^{i'} + L_P (1 + 0)^{i'} 2f \)
B: \( \nu_B = \cdot L_H (1 + 0)^{i'} + L_P (1 + 0 + t)^{(1 + i') 2} f \)
C: \( \nu_C = \cdot L_H (1 + 0 + t)^{(1 + i') 2} f \)

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