Answers to questions for *An Introduction to Geographical Economics*

Chapter 8 Agglomeration and international business

*Question 8.1*

Find more empirical evidence on the relevance of the separate factors in the OLI approach with respect to the explanations of multinationals; which factors are most important, those that stress the O, the L, or the I in this approach?

*Answer 8.1*


The OLI approach stresses elements such as intellectual property rights, organizational skills, brand recognition as important competitive elements for a foreign based firm to compete with local firms. The standard empirical methodology is to regress some sort of indicator of multinational activity on variables which measure these elements. In these types of studies the R&D content of the industry to which a firm belongs is important, as is brand recognition. In general these studies tend to indicate that knowledge based assets are important to become multinational. It also turns out that internalization is more efficient than licensing a product to a foreign firm; licensing carries extra costs (the reasons for this include, the fear that the licensee runs off with his/her newly acquired knowledge, does not measure up to the parents quality demands, and ruins the brand reputation, etc). These two elements, the O and the I of OLI, seem the most important. There is some evidence that high transport cost (high distance) stimulates foreign production. However, evidence on the effects of trade barriers on multinational production is mixed. So the conclusions with respect to the L of the OLI approach is more ambiguous. On the whole empirical evidence on this issue is rather ad hoc, and different elements are measured by different proxies and no single methodology is used in these types of studies.
**Question 8.2**
The neo-classical trade theory provides an explanation for the existence of (vertical) multinationals. Can you find evidence for the combination of a). the absence of international factor price equalization and b). the presence of multinationals?

**Answer 8.2**
Helpman and Krugman (1985, Market Structure and International Trade, MIT), give a theoretical discussion on how differences in endowments could lead to differences in factor prices, which subsequently can lead to multinational production. If factor prices are not equalized it might be profitable to move, for example, a labour intensive part of production to a low wage country. In practice factor price equalization is hard to find, so this might cause multinational production.

The largest differences in factor prices are found between the North and the South. If one looks at one of the most fragmented industries, the textile and clothing industry, the difference is indeed enormous. Graziani (2001, Subcontracting in the textile and clothing industry, in: Arndt and Kierzkowski, eds., Fragmentation, OUP, Oxford) shows that in the textile industry the relative labour cost per hour in the textile industry in Belgium is 204 (US=100), whereas in Pakistan the labour costs per hour are 4! In this industry typically a lot is done by subcontracting, but in the high fashion segments vertical multinational production is present (because of , for example, the fear of sharing designs with other producers, so here the O, L and the I are combined). The observation that differences in factor prices lead to multinational production is clearly present in this industry.

**Question 8.3**
Apply the same procedure as in Chapters 3 and 4 to derive the equations that describe the short run equilibrium of (8.2)-(8.5').

**Answer 8.3**
First take a look at Table 4.2 which describes the normalizations we use in the book. The full employment requirement of the labour requirement in region 1 (note that by
assumption every variety has a headquarter in region 1) gives \( L_i = \alpha (N_1 + N_2) + N_1 \alpha (\varepsilon - 1) \), using \( \alpha = \gamma L / \varepsilon \), (see Table 4.2) gives (8.2). Equation (8.2') is straightforward by inspecting Figure 8.4. The required production labor per firm is \( \alpha (\varepsilon - 1) W_1 / W_2 \). Multiplying by \( N_2 \) and using \( \alpha = \gamma L / \varepsilon \), gives (8.2'). Equation (8.3) is identical to (4.1') Equation (8.4) is similar to (4.2), however now we have included \( N_r \) instead of \( \lambda_r \), because in this case it no longer holds that \( \lambda_r = N_r \) as in the standard case. Technical note 3.5 shows how we can derive the price index equation for the present case. Equation (8.5) is the same as equation (4.3') for the reasons stated in the text. Equation (8.5') is different because production in region 2 takes place without fixed costs. This means that the equilibrium supply of a variety equals \( (\varepsilon - 1) (\alpha / \beta) W_1 / W_2 \) - see Figure 8.4 - rather than \( (\varepsilon - 1)(\alpha / \beta) \), as in the standard case. Now look again at Technical note 3.6, equation (8.5') follows immediately.

**Question 8.4**

Figure 8.5 suggests that if transport cost become arbitrarily large (\( T \rightarrow \infty \)), the fraction of manufacturing workers in country 1 can be determined precisely; eye-balling the figure this fraction might be in the neighbourhood of 2/3. Can you derive this fraction analytically (or approximate) and can you explain it economically? Hint: use the fact that in the long-run equilibrium real wages are equal and then calculate \( \lambda_r \).

**Answer 8.4**

This requires some patience and some tedious algebra. However, no general solution exists and it depends on the values of \( \varepsilon \) and \( \delta \), as the simulation values stated below Figure 8.5 might have suggested to you. You can verify this by using \( (W_1 / W_2) (I_1 / I_2) = 1 \) and letting \( T \) go to infinity.

**Question 8.5**

The economic geography approach stresses the importance of transportation costs. Can you find evidence that multinationals that produce commodities subject to high transportation costs are of the horizontal type?
Answer 8.5

Transport cost are important in oversea production and investment. The products which are most suitable for production abroad are those that have large value relative to their weight or bulk. Typically for those products transport cost are relatively small. Yeats (2001, Just how big is global production sharing , in: Arndt and Kierzkowski, eds., Fragmentation, OUP, Oxford) finds that international freight and insurance charges are about 2 percent for watches and jewelry, but can be 40 per cent for furniture and other wood products. He finds that in general offshore assembly processing is negatively related to transport costs (which is relevant for multinationals of the vertical type). With respect to multinationals of the horizontal type Yeats quotes a remark made by Assar Lindbeck on a nobel symposium: "given other costs, firms chose between alternative international locations in order to minimize transport costs. These costs, therefore, may become low precisely because they have been highly important for location - high transport cost locations are avoided if other cost are equal." On the same symposium Bhagwati noted "even if transport costs for any alternative location were a small proportion of total product price, they could still affect location if they varied geographically more than other costs of production." These two quotes suggest that the example you may have found, is one of multinational production within the OECD area, and not of multinational production between the North and the South. More literature can be found in: Bowen, Hollander, and Viaene (1998), Applied International Trade Analysis, Macmillan, p. 497.