Answers to questions for An Introduction to Geographical Economics

Chapter 6 Refinements and extensions

Question 6.1.
Figure 6.1 suggests that port-cities have a natural advantage over other cities in the sense that they have an extra "dimension" to trade, compared to "land-locked" cities. Can you find evidence that port-cities are indeed on average larger than other types of cities (distinguish between land-locked cities and cities along rivers).

Answer 6.1
You can try to find evidence from your own country. In the Netherlands Rotterdam is a very good example. It is near the sea, it is connected to the hinterland by navigable waterways and other good transportsystems. All in all this makes the port of Rotterdam an excellent location, and makes Rotterdam the largest port in the world. In general these types of issues have been extensively discussed by Mellinger, Sachs and Gallop. In their article "Climate, Coastal Proximity, and development" published in the Oxford Handbook of Economic Geography (2000, Clark, Feldman, Gertler, eds.) they conclude, p.191:

"Climate and coastal proximity are two key geographical gradients of economic development. Temperate ecozones and regions within 100km of sea-navigable waterways are home to more than 50 per cent of the world's economic output, but encompass only 8 per cent of the world's inhabited landmass. The near ecozones contain on average ten times the GNP densities of the far ecozones. Comparing the economic density of the near temperate ecozones with the far non-temperate ecozones, the GNP densities are on average 18 times greater."

They conclude in their study that tropical climates could be detrimental to development, because of the prevalence of infectious diseases. Interior regions have higher transport costs than coastal regions or regions near navigable waterways. Furthermore, unfavorable
initial conditions might have worked against tropical and land-locked regions. The reasons given here might have hold for the past and could diminish over time, but for now it seems that geography is indeed important in explaining development issues.

Question 6.2
In practice almost all commodities are costly to trade. The study by Davis (1998) suggests that in that case the home-market effect probably vanishes. Can you find evidence that this is indeed the case? Hint: are large countries net exporters of commodities produced under firm specific scale-economies (use intra-industry trade figures as an indication).

Answer 6.2
The answer refers back to the discussion in chapter 5 of the difficulties measuring the home-market effect in practice. Davis and Weinstein note that with positive transport costs the New Trade theory allows for an empirical hypothesis that differentiates trade models based on increasing returns, including Geographical Economics, from their Neoclassical counterpart, because it gives rise to the so-called home market effect. It states that an increase in a country’s demand for products of a specific industry will lead to a more than proportional increase in that country’s production in that industry, and thus in net exports of these products.

Looking at empirical work in international trade it is hardly surprising that no firm conclusions can be drawn. In fact, in a highly critical paper on the progress of empirical research in international trade Davis and Weinstein (2001, What is the role for empirics in international trade? NBER working paper, No. 8543) conclude, p.31: "…virtually all of the most important empirical questions [in the field of international trade theory] remain open and at times nearly untouched."

However, as to the question whether or not large countries are on average net exporters of products produced under economies of scale there is some evidence. Helpman (1987, Imperfect competition and international trade: evidence from fourteen industrial
countries, Journal of the Japanese and International Economy, Vol.1, pp.62-81) tries to find out whether or not countries that are larger will have a more than proportional share of differentiated products and will have a trade surplus in these countries. Helpman finds indeed some evidence for the home market effect (he does not explicitly refer to the home market effect but his results can be interpreted as such). Larger countries tend to be net exporters of differentiated products, but the larger the country that is a net exporter of differentiated products the smaller the share of intra-industry trade in the total volume of trade (which than entails relatively more inter-industry trade, see figure 6 in Helpman, 1987). So, looking at trade data, which by definition are subject to transportation costs, the home market effect does seem to be present.

**Question 6.3**

The QWERTY story has served as the prime example to illustrate the importance of initial conditions to reach a particular equilibrium. The often, implicit, assumption is that such an equilibrium is possibly not the most efficient one. Although convincing as a story it is not always the case, even in the QWERTY example. The idea can also be found surrounding the Information and Communication Technology (ICT), because these technologies are inherently characterized by increasing returns to scale. Try find evidence that QWERTY might not be that bad or that "networks", may not always be characterized by increasing returns to scale. Just to convince yourself that you have to be careful listening to stories.

**Answer 6.3**

If a market is characterized by multiple equilibria the possibility that one ends up in the "wrong" one is always a possibility and potentially a sign of market failure. The example of the QWERTY keyboard could be such an example. The question is whether or not the keyboard lay-out of our typwriters is indeed an example of lock-in effects.

The QWERTY design (patented by Christopher Sholes in 1868 and sold to Remington in 1873) aimed to solve a mechanical problem of early typewriters. When certain combinations of keys were struck quickly, the type bars often jammed. To avoid this, the
QWERTY layout put the keys most likely to be hit in rapid succession on opposite sides. This made the keyboard slow, the story goes, but that was the idea. A different layout, which had been patented by August Dvorak in 1936, was shown to be much faster. Yet the Dvorak layout has never been widely adopted, even though (with electric typewriters and then PCs) the anti-jamming rationale for QWERTY has been defunct for years. This is a story which Paul David has told many times.

According to The Economist of April 1, 1999, the evidence supporting claims of Dvorak’s superiority is thin. The main study was carried out by the United States Navy in 1944. The speed of 14 typists retrained on Dvorak was compared with the speed of 18 given supplementary training on QWERTY. The Dvorak typists did better. However, the experiments were conducted by Lieutenant-Commander August Dvorak, the owner of the Dvorak layout patent. Other probably more objective studies have shown that this particular alternative (the Dvorak keyboard) is not necessary better than the QWERTY layout. Whether or not the QWERTY keyboard is better than alternative ones is very interesting. For our purpose it suffices to note that more than one equilibrium exist, and that in principle the equilibrium that gets established is not necessarily the best one.

As to positive feedbacks of networks, Paul Krugman wrote an interesting article, which can be found on his (old) web-site: [http://web.mit.edu/krugman/www/metcalfe.htm](http://web.mit.edu/krugman/www/metcalfe.htm)

He shows that networks are not always characterized by increasing returns to scale, but could instead be characterized by decreasing returns to scale. The central idea is easy to understand. If one builds a network one usually starts connecting the largest number of customers first. For example, by starting to connect the customers (of say, a telephone network) in the largest cities first. Later additions to this network are of less value because they connect customers in smaller cities to this network. By connecting ever smaller groups of customers to a network leads to diminishing rather than increasing returns to scale.
**Question 6.4**

In the USA and the UK the relative wages of low-skilled labor have decreased significantly in the last 20 years or so (see Table 6.1). This has not happened in many continental European countries. Use the discussion in Box 6.2 to explain why this different development may have occurred even if labor markets in continental Europe would have been as flexible as labor markets in the USA and the UK. Hint: use the crucial feature of Geographical Economics models that the relationship between relative wages and transport costs is non-linear.

**Answer 6.4**

From the discussion of the core model in Chapter 4, see in particular Figure 4.2, we know that a fall in transportation costs (the proxy for globalization) has a non-linear impact on the relative wage between regions. This key insight also holds in the two-region, intermediate goods version of the geographical economics models that has been discussed in the present Chapter. This version is used by for instance Krugman and Venables (1995) to show that, starting from very high transportation costs, a fall in transport costs at first leads to a relative wage increase for the large region. But as transport costs continue to fall that this process will be reversed and the small region will see its relative wage increase. The message here is that the impact of globalization on the relative inter-regional wage depends on the degree of globalization. The problem is that, see Box 6.2, the Krugman-Venables model only has one type of labor. If one extends the Krugman-Venables analysis so as to include two types of labor (high-skilled and low-skilled) and also allows for two types of transportation costs which each affect high-skilled and low-skilled labor differently, the findings shown in Table 6.1 might be explained even if wages are fully flexible. How is this possible? The familiar struggle between the agglomeration and spreading forces and the impact of a change in transportation costs on the outcome of this struggle drive the Krugman-Venables result. This insight can continue to hold in a set-up where we have two types of labor and two types of transportation costs. To see this, suppose that low-skilled labor is relatively more influenced by a fall of the transportation costs of unfinished goods and that the same holds for high-skilled labor and the transportation costs of (tradable) services. The reason
being that low-skilled labor is predominantly used in the production of unfinished goods and high-skilled labor in the production of services. What happens in such a world when for instance the transportation costs of unfinished goods fall and we take the perspective from the large region? First, we have the Krugman-Venables insight that depending on the initial level of transport costs both types of labor in the large region might see their relative wage (relative to the wage of corresponding type labor in the small region) increase or decrease. Whatever the level of transportation costs high and low skilled wages in the large region behave qualitatively in the same way. This leaves the question how the fall in the transportation costs of unfinished goods might alter the relative within the large region. This is where the second step comes in. It can be shown (see Peeters and Garretsen, 2000) that a fall in the transportation cost of unfinished goods always has a larger impact on the low-skilled wage because of the fact that low-skilled labor is used more intensively in the production of unfinished goods. [The same holds for a change in the transportation costs of services and the impact on the high-skilled wage]. The second step means that even if wages are flexible, globalization can have a different impact on the high-skilled/low-skilled wage across the OECD countries. The impact now not only, as with Krugman-Venables, depends on the size of the country and the overall degree of globalization but also on the precise nature of globalization (here, which type of transportation costs is reduced and the way in which different type of transportation costs interact with the production structure).

For further details on the extension of the Krugman-Venables model with respect to the globalization debate see J. Peeters and H. Garretsen, 2000, Globalisation, Wages and Unemployment: An Economic Geography Perspective, CESifo Working Paper, no. 256, Munich. (paper can be downloaded from CESifo’s homepage: http://www.cesifo.de)