Chapter 7 External Economies of Scale and the International Location of Production

Answers to Textbook Problems

1. Cases *a* and *d* represent external economies of scale as industry production is concentrated in just a few locations. The benefits of geographical clustering include a greater variety of specialized services to support industry operations, access to a larger pool of specialized labor, and thicker input markets. Cases *b* and *c* represent internal economies of scale because a single firm/plant is producing the output for the whole industry. As the output of a single firm increases, average costs will fall. This can lead to imperfect competition as it supports a limited number of firms in an industry.

3. Dynamic increasing returns occur whenever average costs fall with cumulative output. In other words, a learning curve exists that favors established producers over startups. This is an open-ended question, though the examples in Question 9 provide some ideas. Two industries characterized by dynamic increasing returns are biotechnology and aircraft design. Biotechnology is an industry in which innovation fuels new products, but it is also one where learning how to successfully take an idea and create a profitable product is a skill set that may require some practice. Aircraft design requires innovations to create new planes that are safer or more cost efficient, but it is also an industry where new planes are often subtle alterations of previous models and where detailed experience with one model may be a huge help in creating a new one.

4. a. The relatively few locations for production suggest external economies of scale in production. If these operations are large, there may also be large internal economies of scale in production.
b. Because economies of scale are significant in airplane production, it tends to be done by a small number of (imperfectly competitive) firms at a limited number of locations. One such location is Seattle, where Boeing produces airplanes.
c. Because external economies of scale are significant in semiconductor production, semiconductor industries tend to be concentrated in certain geographic locations. If, for some historical reason, a semiconductor is established in a specific location, the export of semiconductors by that country is due to economies of scale and not comparative advantage.
d. “True” scotch whiskey can only come from Scotland. The production of scotch whiskey requires a technique known to skilled distillers who are concentrated in the region. This labor market pooling suggests external economies of scale. Also, soil and climactic conditions are favorable for grains used in local scotch production. This reflects comparative advantage.
e. France has a particular blend of climactic conditions and land that is difficult to reproduce elsewhere. This generates a comparative advantage in wine production.
5. a. Both countries have identical forward-falling supply curves, so the pattern of production will depend entirely on which country establishes its industry first. The country that moves first will have a cost advantage over the other country because it is producing a larger quantity of the good. That country will produce the entire output of the good and export to the second country.
b. Both countries benefit from international trade in this case as the price of the good will be lower

when one country produces the entire output as compared to both countries producing half of the output. The only way that the importing country would not benefit from trade is if it were a much more efficient producer than the exporting country (but due to increasing returns, cannot compete with an established industry). However, both countries have the same supply curve, so they both gain from trade.

6. The three forces driving external economies of scale are access to specialized suppliers, labor market pooling, and knowledge spillovers. As these forces weaken, so too do the cost advantages of geographic clustering. The location of production becomes increasingly driven by factor costs when industries move away from external economies of scale toward traditional constant returns to scale.

7. Even with higher wages in China, the external economies of scale industries located in China may not move to lower-wage countries. Consider Figure 7-4 in the text. China's average cost curve lies above Vietnam's reflecting higher wages in China. However, the fact that Chinese industry is established gives it a cost advantage over any Vietnamese firms who would enter into the industry and face an initial cost higher than the established Chinese firms. Production would only shift to Vietnam if China's average cost curve were to shift up enough so that the new equilibrium price and cost in China lies above the startup cost in Vietnam.

8. Consider again two different scenarios: In scenario 1, there are two firms in the same location and a local labor supply of 200 for both firms. In scenario 2, the two firms are far apart, and each firm has a local labor supply of 100. Now suppose that both firms are expanding, increasing their demand for labor up to 150 each. In the first case, each firm will face a local labor shortage of 50 workers (assuming each firm is able to hire 100 workers). In the second case, each firm will experience the same local labor shortage of 50 workers! Thus, locating next to each other does not present any disadvantages over locating far apart when both firms are expanding. There still is, however, an advantage when one firm is expanding and the other is contracting.

9. a. External economies of scale are likely due to the need to have a common pool of labor with technical skills. Dynamic increasing returns may be likely due to the need for continual innovation and learning.
b. External economies are unlikely because it is difficult to see how the costs of a single firm would fall if other firms are present in the asphalt industry. Dynamic increasing returns are also unlikely as the asphalt industry is pretty well established and learning curves are likely to be low.