

Discussion Questions/Exercises

1. Assume a firm produces baseball bats, using 10 tons of wood to produce 3 tons of bats. It costs \$1 per ton per mile to transport wood, and \$2 per ton per mile to transport bats. Assume all other inputs to production are ubiquitous (available at all locations for the same price).
 - a. What are the monetary weights for wood and bats respectively?
 - b. If it is 10 miles from the forest (F) to the market (M), show the procurement cost, the distribution cost, and the total transport cost for this firm. Where does it locate?Now, for each of the following three cases, show how your graph from **b** is affected and explain if the optimum location changes.
 - c. The cost of shipping bats increases from \$2 to \$4 per ton
 - d. The forest at F burns down and the firm has to use wood from point G, which is 10 miles west of point F (20 miles from the market).
 - e. The firm starts producing bats with wood and cork, using 6 tons of wood and 2 tons of cork to produce 3 tons of bats. Cork is ubiquitous.
2. Consider some different types of industries and their location decisions:
 - a. Why do breweries typically locate near their markets (far from their input sources), while wineries typically locate near their input sources (far from their markets)?
 - b. The building of wooden ships is a weight-losing activity, as evidenced by the piles of scrap wood generated by shipbuilders. Yet shipbuilders locate in ports, far from their input sources (inland forests). Why?
3. Consider a firm that delivers DVD rentals to its customers. The spatial distribution of customers is as follows: 10 DVDs are delivered to location W, 10 miles due west of the city center; 50 are delivered to the city center; 25 are delivered to E, 1 mile due east of the city center; 45 are delivered to F, 2 miles due east of the city center. Production costs are the same at all locations.
 - a. Using a graph, show where the firm should locate. Explain your location choice.
 - b. Suppose that point W is in a valley and point F is at the top of a mountain. Therefore, the unit cost of easterly transport (shipments from west to east) is twice the unit cost of westerly transport. If production costs are the same at all locations, where should the firm locate? Explain why.
4. Suppose country L has a plentiful supply of labor (and low wages) but a relatively low supply of raw materials. In contrast, country H has plentiful raw materials, but relatively low supply of labor. The two countries are separated by a mountain range that makes travel between them prohibitively costly. Suppose a weight-losing product is initially produced in H. Then suppose that a tunnel is bored through the mountain, decreasing the costs of shipping raw materials and output between the two countries. Assume that labor cannot migrate from one country to the other.
 - a. How will the tunnel affect the location choices of weight-losing firms?
 - b. How will the tunnel affect wages in the two countries?
 - c. How does this relate to both the shift in manufacturing from the US to East Asia, and the narrowing of the wage differential between the US and East Asian countries?

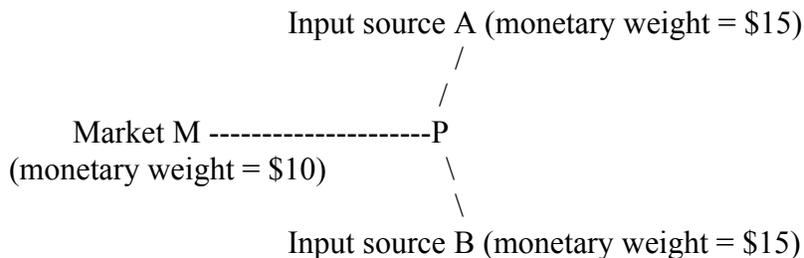
5. Consider the location choice of the pizza firm from last class, where it located at Y because this was the median location (see diagram).

	W	X	Y	S	Z
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Miles from W:	0	1	2	3	9
Number of consumers:	2	8	1		10
Monetary weight:	\$4	\$16	\$2		\$20

Discuss the effects of the following changes on the pizza firm's location choice:

- a. A tripling of the distance between Y and Z (from 7 miles to 21 miles)
- b. A tripling of the number of customers at W (from 2 customers to 6 customers)
- c. The firm stops delivery service, forcing consumers to travel to the pizza parlor.

6. Consider the location choice of the sawmill from last class, where it located at the port (P) because this was the median location (see diagram).



If the monetary weight of location B is \$27 instead of \$15, where will the firm locate, and why?

7. Consider a firm that uses one unit of transferable input to produce one unit of output. The monetary weight of the output is \$4 and the monetary weight of the input is \$3. The distance between M (the market) and F (the input source) is 10 miles.
 - a. Suppose that production costs are the same at all locations. Using a diagram that shows procurement, distribution, and total transportation costs, explain where the firm will locate.
 - b. To produce each unit of output, the firm needs one unit of land along with one unit of transferable input. Now suppose that the cost of land increases as one approaches the market. Specifically, suppose that the cost of a unit of land is zero at F but increases at a rate of \$2 per mile as the firm approaches M. Adding to your diagram from **a**, explain where the firm will locate.
8. There is some evidence that people have become more sensitive to air pollution. In other words, people are willing to pay more for clean air. If this is true, what influence will it have on the location decision of firms?
9. The owner of a successful plywood mill states: "Firms don't use location theory to make location decisions. I chose this location for my plywood mill because it is close to my favorite fishing spot." Comment.