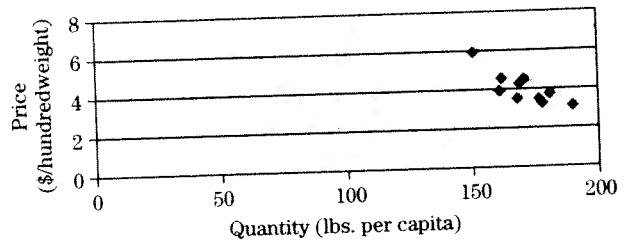


reduced-sugar Oreos and tested them with Chinese consumers before arriving at a formula that tasted right. The new Chinese Oreo consisted of four layers of crispy wafers filled with vanilla and chocolate cream, coated in chocolate. Kraft developed a proprietary handling process to ensure that the chocolate product could be shipped across the country, withstanding the cold climate in the north and the hot, humid weather in the south, yet still be ready to melt in the mouth. Kraft also noticed China's growing thirst for milk and began a grassroots marketing campaign to educate Chinese consumers about the American tradition of pairing milk with cookies. The company created an Oreo apprentice program at 30 Chinese universities that drew 6,000 applicants (Based on: Julie Jargon, "Kraft Reformulates Oreo, Scores in China," *Wall Street Journal*, May 1, 2008.)

c. In developing a line of talking toys aimed at children in China, engineers at Fisher-Price had to struggle to perfect the Mandarin "Sh" sound, which involves a soft hiss that was difficult to encode on sound-data chips embedded in the toys. Developers finally solved the problem of recording the phrase "It's learning time!" in Mandarin, but the company will soon be examining the LCD screens on learning toys to determine whether Chinese characters can be displayed clearly. These challenges arise as Fisher-Price is pursuing new markets in Brazil, Russia, and Poland, where brand-name American toys for toddlers are just beginning to appear and are perceived as novelties. Creating products for these markets has presented some unexpected hurdles such as the problem of recording Mandarin. Previously, Fisher-Price encountered problems with a reading toy called "Storybook Rhymes" that featured a traditional Turkish poem paired with an illustration of a pig. Fisher-Price officials realized this was not appropriate for a Muslim country and replaced the pig with pictures of cats. Market researchers have been traveling around the world searching for the next big market for preschoolers such as India. Many Indian mothers weren't willing to make an investment in the company's educational toys because research showed they didn't perceive the playthings as potential learning tools. But a shift in attitude began about two years ago, along with an increasing middle class able to purchase the toys. (Based on: Nicholas Casey, "Fisher-Price Game Plan: Pursue Toy Sales in Developing Markets," *Wall Street Journal*, May 29, 2008.)

2. The following figure plots the average farm prices of potatoes in the United States for the years 1989

to 1998 versus the annual per capita consumption. Each point represents the price and quantity data for a given year. Explain whether simply drawing the line that approximates the data points would give the demand curve for potatoes.



**FIGURE 4.E1**  
Demand for Potatoes, 1989-1998

Source: Daniel B. Suits, "Agriculture," in *The Structure of American Industry*, ed. Walter Adams and James Brock, 10th ed. (Upper Saddle River, N.J.: Prentice-Hall, 2001).

3. The following table shows the regression coefficients ( $B$ ) and the  $t$ -statistics ( $t$ ) for the variables influencing business traveler demand for hotel rooms (including hotel prices and attributes) from the study that was discussed in this chapter and in Chapter 3.

**BUSINESS TRAVELER DEMAND FOR HOTEL ROOMS**

Attribute	$B$	$t$
Price (\$/night)	-0.0346	(8.83)
Room quality	1.258	(5.92)
1 = average		
2 = finest		
Quality of public areas	0.227	(0.88)
1 = average		
2 = finest		
Check-in time (minutes)	-0.036	(-1.50)
Guaranteed reservation	1.227	(4.88)
1 = no		
2 = yes		
General staff performance	0.169	(0.74)
1 = average		
2 = excellent		
Frequent guest program	0.37	(1.52)
1 = no		
2 = yes		
Availability of nonsmoking floors	0.359	(2.29)
1 = no		
2 = yes		
Availability of free parking	0.969	(4.61)
1 = no		
2 = yes		

Source: Raymond S. Hartman, "Hedonic Methods for Evaluating Product Design and Pricing Strategies," *Journal of Economics and Business* 41 (1989): 197-212. Reprinted by permission.

Which characteristics are most and least important in influencing business traveler demand for hotel rooms?

4. In multiple regression analysis, explain why the typical hypothesis that analysts want to test is whether a particular regression coefficient ( $B$ ) is equal to zero ( $H_0: B = 0$ ) versus whether that coefficient is not equal to zero ( $H_1: B \neq 0$ ).



## Exercises

### Technical Questions

1. The following table shows data for a simple production function.

Capital ( <i>K</i> )	Labor ( <i>L</i> )	Total Product ( <i>TP</i> )	Average Product ( <i>AP</i> )	Marginal Product ( <i>MP</i> )
10	0	0	—	—
10	1	5		
10	2	15		
10	3	30		
10	4	50		
10	5	75		
10	6	85		
10	7	90		
10	8	92		
10	9	92		
10	10	90		

- From the information in the table, calculate marginal and average products.
- Graph the three functions (put total product on one graph and marginal and average products on another).
- For what range of output does this function have diminishing marginal returns?
- At what output is average product maximized?

2. The following table shows data for a simple production function.

Capital ( <i>K</i> )	Labor ( <i>L</i> )	Total Product ( <i>TP</i> )	Average Product ( <i>AP</i> )	Marginal Product ( <i>MP</i> )
10	0		—	—
10	1			25
10	2			75
10	3			120
10	4			83
10	5			54
10	6			35
10	7			22
10	8			10
10	9			4
10	10			1

- From the information in the table, calculate total and average products.
  - Graph the three functions (put total product on one graph and marginal and average products on another).
  - For what range of output does this function have diminishing marginal returns?
  - At what output is average product maximized?
3. Jim is considering quitting his job and using his savings to start a small business. He expects that his costs will consist of a lease on the building,

inventory, wages for two workers, electricity, and insurance.

- Identify which costs are explicit and which are opportunity (implicit) costs.
- Identify which costs are fixed and which are variable.

4. Jill resigns from her job, at which she was earning \$50,000 per year, and uses her \$100,000 savings, on which she was earning 5 percent interest, to start a business. In the first year, she earns revenue of \$150,000, and her costs are as follows:

Rent	\$25,000
Utilities	\$12,000
Wages	\$30,000
Materials	\$20,000

- Calculate Jill's accounting profit.
  - Calculate Jill's economic profit.
5. The following table shows data for the simple production function used in Question 1. Capital costs this firm \$20 per unit, and labor costs \$10 per worker.

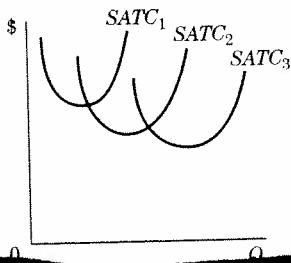
<i>K</i>	<i>L</i>	<i>TP</i>	<i>TFC</i>	<i>TVC</i>	<i>TC</i>	<i>AFC</i>	<i>AVC</i>	<i>ATC</i>	<i>MC</i>
10	0	0							
10	1	5							
10	2	15							
10	3	30							
10	4	50							
10	5	75							
10	6	85							
10	7	90							
10	8	92							

- From the information in the table, calculate total fixed cost (*TFC*), total variable cost (*TVC*), total cost (*TC*), average fixed cost (*AFC*), average variable cost (*AVC*), average total cost (*ATC*), and marginal cost (*MC*).
  - Graph your results, putting *TFC*, *TVC*, and *TC* on one graph and *AFC*, *AVC*, *ATC*, and *MC* on another.
  - At what point is average total cost minimized? At what point is average variable cost minimized?
6. The following table shows data for the simple production function used in Question 2. Capital costs this firm \$50 per unit, and labor costs \$20 per worker.
- From the information in the table, calculate total fixed cost (*TFC*), total variable cost

## Exercises

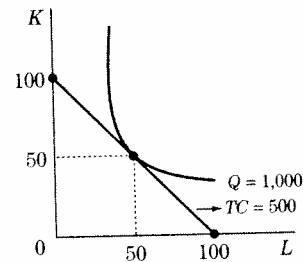
### Technical Questions

- A company operates plants in both the United States (where capital is relatively cheap and labor is relatively expensive) and Mexico (where labor is relatively cheap and capital is relatively expensive).
  - Why is it unlikely that the cost-minimizing factor choice will be identical between the two plants? Explain.
  - Under what circumstances will the input choice be relatively similar?
- The following graph shows short-run average total cost (SATC) curves for three different scales of production. If these are the only plant sizes possible for this firm, what will the firm's long-run average cost curve be?

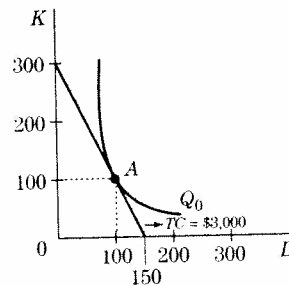


- Industry studies often suggest that firms may have long-run average cost curves that show some output range over which there are economies of scale and a wide range of output over which long-run average cost is constant; finally, at very high output, there are diseconomies of scale.
  - Draw a representative long-run average cost curve, and indicate the minimum efficient scale.
  - Would you expect that firms in an industry like this would all produce about the same level of output? Why?
- Each of the following statements describes a market structure. What would you expect the long-run average cost curve to look like for a representative firm in each industry? Graph the curve, and indicate the minimum efficient scale (MES).
  - There are a few large firms in the industry.
  - There are many firms in the industry, each small relative to the size of the market.
- [Appendix Exercise] For each of the following technologies, graph a representative set of isoquants:
  - Every worker requires exactly one machine to work with; no substitution is possible.
  - Capital and labor are perfect substitutes.
  - The firm is able to substitute capital for labor, but they are not perfect substitutes.

- [Appendix Exercise] A firm pays \$10 per unit of labor and \$5 per unit of capital.
  - Graph the isocost curves for  $TC = \$100$ ,  $TC = \$200$ , and  $TC = \$500$ .
  - Suppose that the cost of capital increases to \$10. Graph the new isocost curves.
- [Appendix Exercise] The following graph shows the firm's cost-minimizing input choice at current factor prices.



- What are the current prices of capital and labor, based on the graph?
  - Suppose that the price of labor increases. If the firm wishes to continue to produce the current level of output, how will the firm's optimal input choice change (relative to its current choice)? Support your answer with a graph.
- [Appendix Exercise] The following graph shows the firm's cost-minimizing input choice at current factor prices. The firm is currently employing 100 units of capital and 100 units of labor. The wage rate is \$20, and the price per unit of capital is \$10.



- In the short run, the firm cannot change its level of capital. The price of labor rises to \$25. If the firm wishes to continue to produce the current level of output, show the firm's short-run cost-minimizing input choice.
- What will happen to the firm's short-run cost curves?
- How will the firm's cost-minimizing input choice be different in the long run, when all factors of production are variable? Support your answer with a graph.