Chapter 4

REVIEW CONCEPTS

Accounting Cost: The costs reported in the firm's official financial statement.

Ceteris Paribus: Latin for "all other things held constant." Commonly assumed in economics when analyzing the impact of a change in one particular variable on another.

Demand Function: The relationship that exists between the number of units of a good or service that consumers are willing to buy, and a given set of conditions that influence the willingness to purchase, such as price, income level, and advertising.

Dependent Variable: A quantity whose value we want to explain or predict based on its relationship with other determining or influencing variables that we call independent variables.

Economic Cost: The value of an input in its best alternative employment; that is, the opportunity cost of using the input.

Fixed Cost: Costs that do not vary with the quantity of output produced.

Function: A representation, in mathematical, tabular, graphical, or other form, of how two or more quantities change in relation to one another.

Independent Variable: A variable used to describe, predict, and control the dependent variable.

Marginal Analysis: A basis for making various economic decisions by computing the additional (marginal) benefits derived from a particular decision and comparing them with the additional (marginal) costs incurred.

Marginal Cost: The incremental increase in total cost that results from a one-unit increase in output.

Marginal Revenue: The change in total revenue that results from a one-unit change in quantity demanded.

Outcomes: The social impact or result of a decision, representing the combined impact of outputs and other (environmental) independent variables.

Output: The level of a good or service that is produced, as measured by some quantitative indicator.

Production Function: The relationship between quantity of inputs used to make a good or service and the quantity of output of that good or service.

Sunk Cost: A cost that has already been committed and cannot be recovered.

Total Costs: The market value of inputs a firm uses in production.

Total Revenue: The amount of money received by sellers of a good or service, computed as the price of the good or service times the quantity sold.

Variable: A quantity that takes on different numerical values in different circumstances.

Variable Cost: The cost of all the inputs whose level varies with output.
EXERCISES

1. The following cost data apply to concerts by Little Falls Symphony Orchestra:

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<th>Q</th>
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<th>VC</th>
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<th>AVC</th>
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(a) Fill the blanks in the table. Note: Place the marginal cost between any consecutive quantities next to the higher quantity. For example, if you decide that the marginal cost between the quantities of 12 and 13 was $45, and if the table were a bit longer, you would put $45 next to a quantity of 13. You may find that doing this part in a spreadsheet such as Excel is more efficient and insightful.

(b) On a graph, plot and label the Average Variable Cost, Average Cost, and Marginal Cost curves. Fractional outputs are allowed, so you can connect the dots when drawing these curves.

(c) If your diagram is correct, AVC declines at first and then rises. Why is this pattern so typical?

(d) What is the level of output that leads to the minimum Average Variable Cost? Why is this level important to managers?

(e) Does the marginal cost curve intersect the average cost curve where AC is rising, falling, or at its minimum point? Explain.

(f) If fixed costs were $300 instead of $150, how would your MC curve be affected?

(g) Given the cost data above, how many concerts per season should this orchestra produce if the goal is profit maximization and the market price for a concert is $40.00? How much profit will the orchestra make if they do that?

(h) Given the cost data above, how many concerts per season should this orchestra produce if the goal is output maximization subject to a break-even constraint and the market price for a concert is $40.00?

(i) Given the following data on demand, fill in the blanks below (placing Marginal Revenue between any two quantities next to the higher quantity and assuming that there is no fixed revenue).
The Orchestra faces the following demand (downward-sloping) curve:

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(j) How many concerts should this orchestra produce if it faces the cost and revenue functions given above, wants to maximize profits from concerts, and can choose its price? How much will profits be at this maximum?

(k) In the long run, the $100 in fixed costs becomes a variable cost rather than a fixed cost. Suppose that there are no other long-run changes in the cost or demand functions. With this added information, what would the orchestra do when it reached the long run if:

- It faced a market price of $40.00 and wanted to maximize profits?
- It faced a market price of $40.00 and wanted to maximize output subject to breaking even?
- It was free to choose its price and wanted to maximize profits?

2. Suppose you were to organize a fund-raising campaign for Save the Park, an environmental advocacy group in your community. Consider the costs of organizing and running a campaign and answer the following questions:

(a) Choose a single method you will use to raise funds (e.g., a direct mail campaign, special event dinner, telemarketing, crowd sourcing on the Internet or social media, etc.) and specify the time period over which this activity will take place.

(b) List all of the different types of costs you will incur in carrying out the fund-raising campaign.

Assume that “number of dollars raised” is your output measure. Now identify:

(c) The components of cost which are fixed; i.e., do not vary with output.

(d) The components of cost which are variable, i.e., which do vary with the level of output.

(e) Explain which of the fixed costs would become variable if you considered operations over a longer time period.
(f) Using your best judgment, or data to which you may have access, make quantitative estimates of the fixed and variable costs at different levels of output and display these costs in a table.

(g) From the numbers in your table, calculate Total, Average, and Marginal costs at each level of output, and display these as three additional columns in your table or in a separate table.

(h) Draw on a single graph, the total, average, and marginal cost curves which show how these quantities vary as output changes.

(i) Using your graphs or table, determine the optimal level of the campaign if your goal is to maximize the financial returns (donations minus cost of solicitation). How much should you spend and how much money will you make?

3. Suppose you are organizing a conference for the Professional Society of Association Professionals. The society finances the conference with participant registration fees (the same for every attendee) plus a foundation grant explicitly designated for the conference. The grant is a fixed dollar amount, rather than a subsidy for each attendee, and must be returned to the foundation if the conference is canceled for any reason. Registration covers all conference materials and meals. The costs of the conference involve renting a facility, organizing the program and arranging for speakers, and providing materials and meals for each participant.

   (a) Using graphs, describe the total, average and marginal revenue functions.
   (b) Classify costs into fixed and variable components and graph the total, average, and marginal cost functions.
   (c) Using (a) and (b) as a guide, graph a circumstance where the conference loses money but the society is better off financially if the conference is held than if it is canceled.
   (d) Graph an alternate situation in which the society should cancel the conference if it insists on minimizing losses.
   (e) Show a circumstance where the conference makes a positive profit. What can you say about the relationship of the conference fee to marginal cost, and the relationship between average variable cost and the conference fee in this case?

4. The social enterprise Laptops for Littlekids (LFL) provides a basic laptop computer for a child in a low-income community for every laptop it sells to the public. The company sells into a competitive market where it can sell as many computers as it wants at a price that is 10 percent more than the market price because it appeals to socially-minded consumers. LFL’s marginal cost for producing a basic laptop is constant at $50 and its marginal cost for the (fancier) laptop that it sells is constant at $100. There are no fixed costs or fixed revenues to worry about (at least for now).

   (a) What must the market price for a laptop in the market be in order for LFL to break-even?
   (b) How would this change if LFL were to receive a lump-sum grant of $1000 from the MacroHard Foundation to support its operations? How many units could it sell at the price you calculated in (a)?
(c) Using a graph or equation describe the Total Cost, Average Cost and Marginal Cost functions of LFL.

(d) Assuming it receives the grant and the market price for computers is $150, describe the Marginal Revenue, Total Revenue and Average Revenue functions.

(e) What should be LFL's shutdown rule for its computer sales, assuming that it continues to follow its gifting policy? Should LFL follow the rule?