

# Chapter 1

## Managers and Managerial Decisions

### Chapter Summary and Learning Objectives

#### 1.1 Describe managerial economics and explain how it can help advance your career.

Microeconomic theory and models can help you make better decisions as a manager, which will help you have a more successful career as a manager.

#### 1.2 Define what a firm is and describe the legal structures of for-profit firms.

In this section, we define what a firm is and then explore the main types of firms, from sole proprietorships to corporations. We describe the characteristics, advantages, and disadvantages of each, as well as provide examples.

#### 1.3 Compare opportunity cost and accounting cost and explain why using opportunity cost leads to better decisions.

Most managers seek to maximize profit, so in this section we establish some important related concepts: revenues, accounting costs, opportunity costs, sunk costs, etc. We explain the importance of using opportunity costs to calculate economic profit or economic loss, as that should be the focus of managers.

#### 1.4 Explain how managers can use marginal analysis to make better decisions.

Many of the decisions managers have to face are of a marginal nature: should we produce one more unit of output? Should I hire one more employee? Should I undertake a new investment project? In this section, we establish the basics of marginal analysis: using marginal benefit (MB) and marginal cost (MC) to make wise managerial decisions.

### Chapter Outline

#### Introduction

Summary: Your decisions, both large and small, will help determine the success of your company and your career.

#### 1.1 Managerial Economics and Your Career

Learning Objective 1.1: Describe managerial economics and explain how it can help advance your career.

- A. Summary: The application of microeconomic principles can help you make wise business decisions and, as a result, have a successful career as a manager. We use economic models to spotlight the most important aspects of a situation, helping you identify the optimal solution to a problem.

- B. Key Terms:
  - i. **Managerial economics:** The application of microeconomic principles and tools to business problems faced by decision makers.
  - ii. **Economic model:** An abstract, simplified representation of the real world and real-world situations.
- C. **Teaching Tip:** Emphasize that this course, and the models and examples used throughout, are designed not to teach you handle every specific situation, but to give you a framework for being able to understand *any* situation. What data do you need? How do you go about answering the question? Throughout the course, you'll gain the tools necessary to manage a business, large or small, in many different competitive environments. Decades from now, you'll hopefully apply what you've learned to solve problems in industries that don't even exist yet.

## 1.2 Firms and Their Organizational Structure

Learning Objective 1.2: Define what a firm is and describe the legal structures of for-profit firms.

- A. Summary: Whether they are large or small, for-profit or non-profit, firms convert inputs into outputs. Firms are structured into four main groups. Sole proprietorships are owned by one person. Partnerships are owned by two or more people. Limited Liability Corporations (LLCs) are similar to partnerships, except members are not personally responsible for company debt. Corporations are the most complicated firm structure, but are often more successful at raising funds due to their perpetuity.
- B. Key Terms:
  - i. **Firm:** An organization that converts inputs (such as labor) into outputs (goods and services) that it can sell or distribute.
  - ii. **Sole Proprietorship:** A firm owned by one person.
  - iii. **Partnership:** A firm owned by two or more people.
  - iv. **Limited Liability Company (LLC):** A firm owned by one or more members who have limited liability for its debt.
  - v. **Corporation:** A firm owned by one or more shareholders.

## 1.3 Profit, Accounting Cost, and Opportunity Cost

1.5 Learning Objective 1.3: Compare opportunity cost and accounting cost and explain why using opportunity cost leads to better decisions.

- A. Summary: We assume that managers seek to maximize profits; while that might not hold for non-profits or government agencies, the principle of using resources as efficiently as possible still applies. Total revenues ( $P \times Q$ ), are the receipts from the sale of goods or services, although sometimes adjustments are made for discounts or allowances. On the cost side, things become a little more complicated. Accountants use a measure called accounting cost, which are costs of inputs that involve outflows of cash. But sometimes a resource is owned by the firm, so there is no cash outflow. The costs of using these resources are opportunity costs, since the firm could earn revenues from selling or renting the resource instead of using it to produce output. Opportunity cost is a better estimate of the true costs faced by a business than accounting cost, so this is what smart managers should use.
- B. Key Terms:
  - i. **Profit:** The difference between total revenue and total cost.
  - ii. **Total revenue:** The firm's total receipts from the sale of its goods and services.
  - iii. **Accounting costs:** The costs accountants use to keep a firm's financial records.

- iv. **Explicit cost:** A cost incurred by running a business that involves cash outflows.
  - v. **Implicit cost:** A cost incurred by running a business that does not involve cash outflows.
  - vi. **Opportunity cost:** The return from the best alternative use of a resource.
  - vii. **Economic depreciation:** The change in the market value of a capital asset such as land, equipment, or a building.
  - viii. **Competitive return:** The opportunity cost of the owners' funds invested in a company.
- C. **Teaching Tip:** While opportunity costs are the correct form of cost to be using in decision-making, they are sometimes difficult to determine. If one quits a \$80,000 job to run a business, the opportunity cost of their time is clear. But what about 10 years down the road—how much is the owner's labor worth now? Without actually going on the job market, it may be difficult to determine. Emphasize that while opportunity costs provide a more correct value for making decisions, practically it may be difficult to arrive at an accurate value for them.

## 1.4 Marginal Analysis

Learning Objective 1.4: Explain how managers can use marginal analysis to make better decisions.

- A. Summary: Any action you take as a manager has costs and benefits. Marginal analysis allows one to focus on the costs and benefits of doing one more of something, whether it is producing one more unit of output, buying one more ad in a magazine, or hiring one more salesperson. The rule of marginal analysis is straightforward: if the marginal benefit (MB) exceeds the marginal cost (MC), the activity should be undertaken. If  $MC > MB$ , the activity should not be undertaken.
- B. Key Terms:
  - i. **Marginal analysis:** The comparison of the marginal benefit from an action to its marginal cost in order to decide whether to take the action.
- C. **Teaching Tip:** Get creative with new examples of this—do not just use MB and MC of one more unit of output. Consider advertising, and ask students how they would calculate the MB of one more ad. While marginal analysis appears relatively simple, some decisions require a fair amount of thought (and perhaps research or trial-and-error) to accurately determine what the MB and MC actually.

### Extra Example:

1. Chef Gary has been a pioneer of farm-to-table cooking. In fact, he used to be a farmer and decided that he wanted to use everything grown and raised on his farm to make the freshest fine cuisine possible. Sure, some of the spices and ingredients have to be sourced from elsewhere, but 90% of what is in Chef Gary's food is direct from his farm. He spent \$2 million in savings and converted some of his many acres of farmland into a restaurant. He is the head chef and has a staff of about 10 people working for him. He pays his workers cash, but he does not pay himself a salary; the profit of the restaurant is what he claims at the end of the year as his income.
  - a. What are some of the accounting costs for Gary's restaurant? Try to think of at least five.
  - b. What are some of the opportunity costs for Gary's restaurant? Hint: there are three big ones.

- c. Suppose a global epidemic of avian flu causes a massive reduction in the supply of chickens, resulting in a dramatic increase in the market price of the chickens at Gary's farm that he uses to make his famous Chicken Cordon Bleu. What happens to Gary's accounting costs and opportunity costs? As a wise manager of his restaurant, what should Gary do in response to this?

**Solution to Extra Example:**

- a. Gary's accounting costs include the labor costs (wages and salaries) of his employees, electricity and natural gas used to power the restaurant and cook the food, the 10% of food supplies he does not grow or raise on his farm, plates and knives, cleaning products, office products, etc.
- b. Gary's opportunity costs include:
  - i. The value of Gary's time; after all, he could work as a chef in a different restaurant and earn a salary.
  - ii. The interest Gary could be earning on the \$2 million he pulled from his savings to build the restaurant.
  - iii. The value of the vegetables, fruits, eggs, and meats that Chef Gary uses in his meals. Before he ran a restaurant, he would sell these products; now he uses them for food. The cost of using them in the production of meals is an opportunity cost: forgone revenue.
- c. Gary's accounting costs will not change, since he does not have to buy chickens. However, Gary's opportunity costs will increase, since the market price of the chickens that Gary could sell (instead of using them to make Chicken Cordon Bleu) increases. Gary has a few options here. He may decide to stop serving chicken dishes altogether and instead sell his chickens at a farmers market. He may instead simply raise the price of his chicken entrees to account for the increased opportunity cost. Either way, what Gary should *not* do is continue selling his chicken entrees for the same price—the chickens used to produce it are more valuable and this should be reflected somehow in Gary's decision making.

**Answer Key**

Here are the solutions to the questions and problems that appear at the end of the chapter.

**1.1 MANAGERIAL ECONOMICS AND YOUR CAREER**

- 1.1 The information from your managerial economics course will help you make better decisions. This will help your career because decision making is a vital task for any manager.
- 1.2 False. Economic models are simple and abstract in order to clarify the key factors most relevant to the issue at hand. Eliminating the confusing clutter of relatively insignificant details will allow the manager to make better decisions.

**1.2 FIRMS AND THEIR ORGANIZATIONAL STRUCTURE**

- 2.1 Partnerships and proprietorships have their profits taxed only once, while corporations' profits are taxed twice. Corporations also have additional legal requirements compared to partnerships and proprietorships. However, owners of partnerships and proprietorships have unlimited liability (except for limited partnerships). By contrast, owners of corporations benefit from limited liability, which facilitates raising investment capital.

- 2.2 Corporations have a perpetual life. Large firms need a perpetual life so that they will continue operating beyond the death of any one shareholder and instill confidence in lenders. They also need limited liability to attract investors.

### 1.3 PROFIT, ACCOUNTING COST, AND OPPORTUNITY COST

- 3.1 Etsy is a profit-maximizing firm. Rob Kalin openly admitted that he was not interested in maximizing profit, making him unfit to lead the company. As a manager, he had a responsibility to operate the company to promote the interests of the owners.
- 3.2 The New York Jets are a profit-maximizing firm. It was not profitable for the Jets to “do the right thing,” so the Jets’ managers did not adjust Mr. Kendall’s contract higher. To the extent that “doing the right thing” is inconsistent with profit maximization, Mr. Kendall should not have been surprised.
- 3.3 The money already spent on the Concorde project cannot be recovered, as it has already been spent. It is a sunk cost and is irrelevant when deciding the fate of the project. The relevant criteria are the opportunity costs of continuing the project versus the next best use of taxpayer funds. In fact, the idea that you should continue to spend money on a project in order not to waste the money you have already put into it is called the “Concorde fallacy.”
- 3.4 Opportunity cost is a better indicator than accounting cost because it considers the return from alternative uses of the firm’s resources. Consequently opportunity cost measures the *actual* cost of using resources.
- 3.5
- a. As shown in the table below, Ace’s net income for becoming a pro player is \$44,800. This is  $\$54,800 - \$44,800 = \$10,000$  less than her net income as a tennis instructor.

Ace’s earnings as a pro player	\$100,000	Ace’s earnings as a tennis instructor	\$75,000
Transportation and lodging	-20,000	Transportation and lodging	0
Trainer/coach costs	-15,000	Trainer/coach costs	0
Cost of meals	-7,000	Cost of meals	-7,000
Condo rent	-9,600	Condo rent	-9,600
Car payments	-3,600	Car payments	-3,600
<b>Net income</b>	<b>\$44,800</b>	<b>Net income</b>	<b>\$54,800</b>

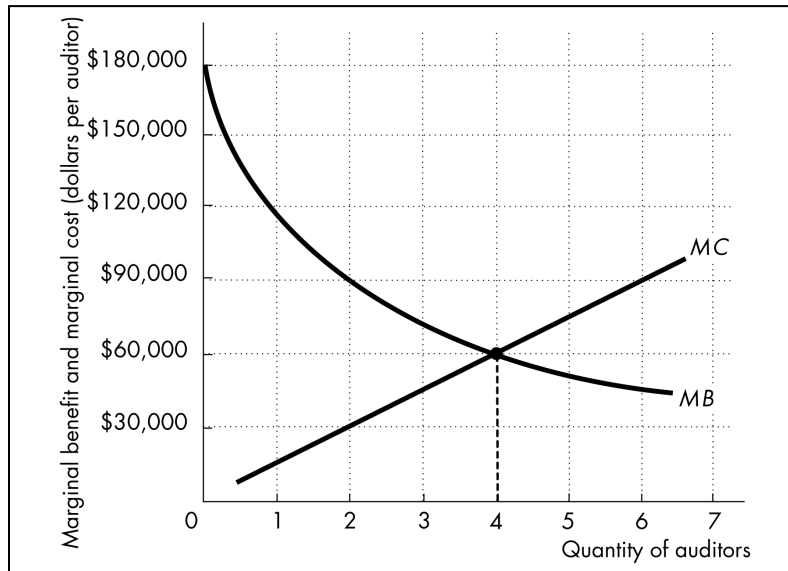
- b. Ace’s opportunity cost of playing tennis is the value of Ace’s next-best foregone alternative—the net benefit that Ace would have received if she had chosen to work as a teaching pro. As shown in the table in part a, Ace foregoes a net income of \$54,800 by playing tennis rather than working as an instructor so Ace’s opportunity cost of playing tennis is \$54,800.

- 3.6 Explicit costs are costs incurred for which there is a cash outflow from the company. Implicit costs do not involve a cash outflow.
- Explicit cost
  - Explicit cost
  - Implicit cost
  - Explicit cost
  - Explicit cost
- 3.7 Henry's explicit costs are the \$1,000 he spent on his coach and the \$1,000 he spent on his golf balls. His implicit costs are the earnings foregone by skipping two tournaments on the PGA tour.
- 3.8 The owners are not taking the opportunity cost of owning their building into account. For instance, it may be more profitable for them to simply rent out their building to their competitor (Kohl's).
- 3.9 No, the analyst is incorrect. There are surely firms that would pay to air ads during the airtime NBC used to promote its own shows. NBC incurs an opportunity cost of the foregone ad revenue it lost by using the airtime for their own ads.
- 3.10 By allocating more shelf space to post cereals, Safeway loses space to allocate to other products (and the associated profit). The foregone profit that could have been earned on those products is Safeway's opportunity cost.
- 3.11 In addition to the information common to both accounting and opportunity costs, we need to know how much Harvey could earn by renting out his building to another firm and we need to know the value of the building if Harvey decides to sell and the return he could from the funds he receives if he sells the building. We also need to know the value of Harvey's time spent on his hardware business.
- 3.12 The opportunity cost is the next best alternative to farming the land. So we need to determine which alternative is more profitable: renting the farm to another farmer or selling it and investing the proceeds at 6 percent. The money gained from selling the land is  $100 \times \$40,000 = \$4,000,000$ . Investing this at 6 percent gives an annual return of  $0.06 \times \$4,000,000 = \$240,000$ . Renting to another farmer gives  $100 \times \$2,000 = \$200,000$  per year. Therefore, the opportunity cost of farming the land yourself is the foregone \$240,000/year return from selling the land and investing the proceeds at 6 percent.
- 3.13
- The depreciation allowance is  $\$10 \text{ million} / 10 = \$1,000,000$ .
  - The value from selling the rig and investing the funds is  $0.09 \times \$6 \text{ million} = \$540,000$ . The value from renting the rig is the difference between the rental income and the economic depreciation on the rig. The rental income is given as \$1.1 million, and the rig's market value declined by \$500,000. Then the total value from renting the rig for one year is  $\$1.1 \text{ million} - \$500,000 = \$600,000$ , making renting the rig the next best alternative. Therefore, the opportunity cost of using the rig is \$600,000.
  - The true cost to your firm of using the rig is \$600,000, the opportunity cost found in part b, because this is the next best alternative. This reflects the true cost more accurately than the depreciation allowance calculated in part a.

- 3.14 a. At \$300 per ton, the opportunity cost per day of feeding all the cattle is  $\$300 \times 200 = \$60,000$ .
- b. The price of barley is \$200 per ton, so the total opportunity cost is now  $\$200 \times 200 = \$40,000$ .
- c. The amount initially paid for the stockpile of barley is a sunk cost. Whether the feed is bought at the current market price or drawn from the stockpile, the opportunity cost is the same because the next best alternative to using the stored barley is selling it at the market price. Consequently, when the price of barley changes, so, too, does the opportunity cost of feeding the cattle.
- 3.15 The FIFO method will value the gold at the purchase price of \$1,400 per ounce. However, the true value of the gold is the current market price (\$800 per ounce). Christina's competitors are most likely pricing their gold pendants much lower due to the reduced market price of gold. Therefore, Christina's will lose sales to their competitors if it continues to price the pendants at \$1,600.

## 1.4 MARGINAL ANALYSIS

- 4.1 a. A second line gives additional surplus of  $MB - MC$ , or  $\$9,000 - \$3,000 = \$6,000$ . A third line gives additional surplus of  $\$7,000 - \$4,000 = \$3,000$ . Operating a third line still has a surplus of benefit over cost, so we should operate it.
- b. The optimal number of lines is 4 because this is where marginal benefit is equal to marginal cost. This maximizes total surplus.
- 4.2 The marginal benefit is now higher than the marginal cost of advertisement. The marginal analysis rule tells us it is optimal to do an action if the marginal benefit exceeds the marginal cost. With the increase in marginal benefit, more advertisements are optimal, so we should increase the marketing budget until the marginal benefit equals the marginal cost.
- 4.3 a. In the figure, four auditors is the quantity that maximizes the organization's surplus because this is the quantity that sets  $MB$  equal to  $MC$ . If more auditors are hired, the marginal cost of each additional auditor is greater than the auditor's marginal benefit, which reduces the total surplus. If fewer are hired, auditors with a surplus of benefit over cost are not employed, which means the total surplus is smaller than otherwise.



- b. All firms should seek to maximize the surplus of benefit over cost. If the firm is profit maximizing, the surplus is profit. If the firm is a nonprofit charity, as in this case, the surplus benefit can be allocated to the charity's recipients.

## 1A Chapter 1 APPENDIX

- A1.1 a. Calculate the surplus-maximizing number of treatments,  $q^*$ , by taking the derivative of the surplus function with respect to  $q$ :

$$d\text{Surplus}/dq = 36q^{-1/2} - 3 = \frac{36}{q^{1/2}} - 3$$

Set  $d\text{Surplus}/dq$  equal to zero to find  $q^* = 144$  treatments.

- b. The NGO can prevent  $72q^{1/2}$  infections by providing  $q$  medical treatments. Thus, when it provides  $q^* = 144$  treatments, it is able to prevent  $72 \times 144^{1/2} = 864$  infections.

- A1.2 a. The total benefit is equal to Moose's total revenue:  $TR = P \times Q$ , or  $TR = \$5Q$ . The marginal benefit of producing and selling each additional hamburger is  $MB = (dTR)/(dQ)$ , or  $MB = \$5$ .
- b. The marginal cost of producing and selling each additional hamburger is  $MC = (dTC)/(dQ)$ , or

$$MC = \frac{d(0.01Q^2 - 25)}{dQ} = 0.02Q$$

- c. Set  $MB = MC$ , or  $5 = 0.02Q$ . Solving for  $Q$  shows that  $Q^*$  equals 250 hamburgers.



- A1.3 a. Determine the surplus-maximizing number of bags of fertilizer,  $f^*$ , by first using the power rule to take the derivative of the surplus function with respect to  $f$ :

$$\frac{d\text{Surplus}}{df} = \left(\frac{1}{2} \times 54 \times f^{1/2}\right) - 3 = \left(27 \times \frac{1}{f^{1/2}}\right) - 3.$$

Set  $d\text{Surplus}/df$  equal to zero to find  $f^*$ :

$$\left(27 \times \frac{1}{f^{1/2}}\right) - 3 = 0 \Rightarrow 27 \times \frac{1}{f^{1/2}} = 3 \Rightarrow 27 = 3 \times f^{1/2} \Rightarrow 9 = f^{1/2} \Rightarrow 81 = f$$

Consequently, the surplus-maximizing number of bags is 81 bags of fertilizer.

- b. Belinda can produce  $27f^{1/2}$  pounds of berries by applying  $f$  bags of fertilizer. So when she applies  $f^* = 81$  bags of fertilizer, she produces  $27 \times 81^{1/2} = 243$  pounds of berries.
- c. Belinda sells 243 pounds of berries, and she receives \$2 per pound for the berries she sells. So Belinda receives total revenue of  $\$2 \times 243 = \$486$ .

- A1.4 a. Determine the surplus-maximizing number of security personnel,  $x^*$ , by using the power rule and quotient rule to take the derivative of the surplus function with respect to  $x$ :

$$\begin{aligned} \frac{d\text{Surplus}}{dx} &= \frac{(x^2 + 4) \times (2 \times 100 \times x) - (100x^2 - 20) \times (2x)}{(x^2 + 4)^2} - 8.4 \\ &= \frac{840x}{x^4 + 8x^2 + 16} - 8.4 \end{aligned}$$

Setting  $d\text{Surplus}/dx$  equal to zero, and solving for the surplus-maximizing quantity of security personnel gives  $x^* = 4$  security personnel.

- b. The level of security equals  $\frac{100x^2 - 20}{x^2 + 4} - 8.40x$ , where  $x$  is the number of security personnel. Scott's surplus-maximizing number,  $x^*$ , is 4 security personnel, which then achieves a security level of  $\frac{(100 \times 4^2) - 20}{4^2 + 4} - (8.40 \times 4)$ , or a security level 45.4.

- A1.5 a. The marginal benefit of producing and selling each additional iced latte is  $MB = (dTR)/(dQ)$ , or  $MB = \$4$ .
- b. The marginal cost of producing and selling each additional iced latte equals the derivative of the total cost function with respect to  $Q$ , or  $(dTC)/(dQ)$ . Use the power rule to take the derivative:

$$MC = \frac{dTC}{dQ} = (2 \times 0.01 \times Q) + 2 = 0.02Q + 2.$$

So the marginal cost function is  $MC(Q) = 0.02Q + 2$ .

- c. To determine the profit-maximizing number of iced lattes,  $Q^*$ , set  $MB = MC$ , or

$$4 = 0.02Q + 2$$

Solving for  $Q$  gives  $Q^* = 100$  iced lattes