PREFACE

The purpose of this manual is to facilitate the use of the text by the instructor. It contains the detailed outline of each chapter and the answers to all the end-of-chapter discussion questions and problems.

The discussion questions at the end of each chapter of the text involve, for the most part, simple applications or recall of what is clearly explained in the text. Their function is to emphasize those concepts, theories, and tools that the student needs to learn and remember. I would encourage students to go over them on their own and check the answers in the text. I would assign the non-asterisked problems at the end of each chapter of the text to be done at home. These problems are challenging but not tricky or very time consuming. They are intended to enlist the active participation of students so as to make managerial economics truly come alive. The student can solve the asterisked problems and check their answers at the end of the book.

The following ancillaries are available for this text (see the Preface to the text for the details of their content:

- Study Guide
- Computerized Test Bank
- Downloadable Power Point
- Analytical Business Calculator (ABC)

I thank you for adopting this text and welcome any comment, suggestion, or opinion that you may have on the use of the text. You can correspond directly with me or through Oxford University Press, and I will personally acknowledge your letter and answer your questions.

D. S.
CONTENTS

PART ONE: INTRODUCTION

Ch. 1 The Nature and Scope of Managerial Economics 1
Ch. 2 The Basic Economic Model: Demand, Supply, and Equilibrium 12
Ch. 3 Optimization Techniques and New Management Tools 29

PART TWO: DEMAND ANALYSIS

Ch. 4 Demand Theory 54
Ch. 5 Demand Estimation 76
Ch. 6 Demand Forecasting 97

PART THREE: PRODUCTION AND COST ANALYSIS

Ch. 7 Production Theory and Estimation 122
Ch. 8 Cost Theory and Estimation 148

PART FOUR: MARKET STRUCTURE AND PRICING PRACTICES

Ch. 9 Market Structure: Perfect Competition, Monopoly, and Monopolistic Competition 173
Ch. 10 Oligopoly and Firm Architecture 194
Ch. 11 Game Theory and Strategic Behavior 215
Ch. 12 Pricing Practices 225

PART FIVE: REGULATION, RISK ANALYSIS, AND CAPITAL BUDGETING

Ch. 13 Regulation and Antitrust: The Role of Government in the Economy 252
Ch. 14 Risk Analysis 268
Ch. 15 Long-Run Investment Decisions: Capital Budgeting 294
CHAPTER 1

THE NATURE AND SCOPE OF MANAGERIAL ECONOMICS

1-1 THE SCOPE OF MANAGERIAL ECONOMICS
Definition of Managerial Economics
Relationship to Economic Theory
Relationship to Decision Sciences
Relationship to the Functional Areas of Business Administration Studies

1-2 THE BASIC PROCESS OF DECISION-MAKING
Case Study 1-1: Peter Drucker – The Man Who Invented Management
Case Study 1-2: The Management Revolution

1-3 THE THEORY OF THE FIRM
Reasons for the Existence of Firms and Their Functions
The Objective and Value of the Firm
Constraints on the Operation of the Firm
Limitations of the Theory of the Firm
Box 1 – Managerial Economics at Work: The Objective and Strategy of Firms in the Cigarette Industry

1-4 THE NATURE AND FUNCTION OF PROFITS
Business versus Economic Profit
Theories of Profit
Function of Profit
Case Study 1-3: Profits in the Personal Computer Industry

1-5 BUSINESS ETHICS
Case Study 1-4: Business Ethics at Boeing
Case Study 1-5: Enron-Andersen and Other Financial Disasters
Case Study 1-6: The Global Financial Crisis

1-6 THE INTERNATIONAL FRAMEWORK OF MANAGERIAL ECONOMICS
Case Study 1-7: The Rise of the Global Corporation
Case Study 1-8: The Global Business Leader
Case Study 1-9: Global Most Admired Companies

1-7 MANAGERIAL ECONOMICS IN A MORE RISKY, CRISIS-PRONE, AND SLUGGISH GLOBAL ECONOMY
Case Study 1-10: Terrorism, Cyber Espionage, Financial Crisis, and Globalization
PART ONE  INTRODUCTION

1-8  MANAGERIAL ECONOMICS AND THE INTERNET

Case Study 1-11: The Most Important Internet Site Addresses for Managerial Economics

SUMMARY
DISCUSSION QUESTIONS
PROBLEMS
APPENDIX TO CHAPTER 1: SOLVING MANAGERIAL DECISION PROBLEMS USING SPREADSHEETS
  Microsoft Excel
    Example
    Solution
SPREADSHEET PROBLEM
SUPPLEMENTARY READINGS
KEY TERMS (in the order of their appearance)

Managerial economics  Value of the firm
Economic theory      Constrained optimization
Microeconomics       Principal-agent problem
Macroeconomics       Satisficing behavior
Model                Business profit
Mathematical economics Explicit costs
Econometrics          Economic profit
Functional areas of business Implicit costs
  administration studies
Firm                  Business ethics
Transaction costs     Sarbanes-Oxley Act
Circular flow of economic activity Globalization of economic activity
Theory of the firm    Internet
                       Information superhighway
CHAPTER 1  THE NATURE AND SCOPE OF MANAGERIAL ECONOMICS

ANSWERS TO DISCUSSION QUESTIONS

1. (a) Microeconomics and macroeconomics provide the theoretical framework for the study of the decision-making process in any organization, which is the subject matter of managerial economics.

(b) Mathematical economics is used in managerial economics to formalize (i.e., to express in equational form) the economic models postulated by economic theory. On the other hand, econometrics is used to estimate and test empirically economic relationships and models.

(c) The fields of accounting, finance, marketing, personnel, and production are the functional areas of business administration studies. These study the business environment in which the firm operates, and, as such, they provide the background for managerial decision-making.

2. Managerial economics utilizes the theoretical tools of microeconomics and macroeconomics, the mathematical and econometric techniques of decision sciences, as well as knowledge of accounting, finance, marketing, personnel, and production (the functional areas of business administration studies) to examine how any organization can achieve its objectives most efficiently. To that extent, managerial economics integrates all of those fields and illustrates to the student the relationship among the various fields and how they interact in the decision-making process.

3. In his *Essays in Positive Economics*, Milton Friedman (a Nobel Prize winner in economics) postulated that a theory must be tested by its predictive ability and not by the realism of its assumptions. The accepted methodology of economics (and science in general) today is to accept a theory or model if it predicts accurately and if the prediction follows logically from the assumptions.

4. The objective of a museum might be to maximize the number of visitors or the size of its artwork collection, subject to its physical and financial limitations or constraints. On the other hand, a firm might seek to maximize profits subject to the resource, legal, environmental, and other constraints it faces. While the goals and constraints of a museum and a firm differ, the decision-making process is basically the same. That is, both seek to maximize an objective in the face of some constraints, in the same general way and by utilizing the same general techniques.

5. Firms exist because of the economies that arise from the organization of production and distribution that they make possible (i.e., to save on transaction costs). A great deal of production and distribution would be too costly and, therefore, impossible without firms. Both entrepreneurs and other resource owners benefit from the existence of firms. Entrepreneurs can earn profits or higher profits, and workers and owners of capital, land, and raw materials receive a higher income or price for the rental or sale of their resources.
6. The theory of the firm postulates that the primary goal of the firm is to maximize the wealth or value of the firm. This is given by the present value of all expected future profits of the firm. By introducing the time dimension, the theory of the firm is superior to the goal of short-term profit maximization because it considers both short-term and long-term profits and also allows for the consideration of uncertainty.

7. The theory of the firm postulates that the primary goal of the firm is to maximize the present value of all expected future profits of the firm. Profits are the difference between revenues and costs, and the time element is introduced by the discount rate. Revenues and sales are the primary responsibility of the marketing department, costs are the responsibility of the production and personnel departments, and financing is dealt with primarily by the finance department. The accounting department, of course, deals with revenues, costs and financing also.

There are many interactions among these departments and these also can be best evaluated within the framework of the formula for the value of the firm. Thus, the theory of the firm provides an integrated framework for the analysis of managerial decision making across the functional areas of business.

8. (a) The increase in sales increases the value of the firm (see Equation 1-2A).

(b) The entrance of a new competitor in the market may reduce the sales of the firm, thereby reducing the value of the firm.

(c) By reducing costs of production, a technological breakthrough increases the value of the firm.

(d) The requirement to install pollution-control equipment increases the costs of the firm and reduces its profitability and value.

(e) To the extent that a labor union is able to increase wages over and above what they would be in the absence of the union, the labor costs of the firm rise and the profitability and value of the firm declines.

(f) A rise in the interest rate increases the cost of capital. The firm will then require a greater return on investment (a higher discount rate). This lowers the value of the firm.

(g) A change in the rate of inflation will affect the revenues of the firm, its costs, and the discount rate and, through them, the value of the firm.

9. The normal return on investment is included as part of profit by businessmen and accountants but as part of costs (the implicit costs) by economists. Thus, business profit minus the normal return on investment or implicit costs equals economic profit. It is economic profit that is important in allocating society’s scarce resources among competing uses.
10. In determining whether profit levels are excessive in a particular industry we must consider the
level of risk in the industry, whether the industry is or is not in long-run equilibrium, the
existence of monopoly power in the industry, the rate at which new innovations are introduced,
and managerial efficiency.

Higher than average profits for the industry need not reflect excessive profits if they reflect
higher risk, long-term disequilibrium, the introduction of more significant innovations, or
managerial inefficiency. A more risky industry requires higher-than-average profits to attract
and retain investments in the industry. Higher-than-average short-term profits may be required
to attract more resources into the industry. They may also be the reward for successful
innovations and greater managerial efficiency. Profits are excessive only to the extent that they
are not required to perform the allocative function that profits are expected to perform in a
free-enterprise economy.

11. Unethical business behavior is behavior that the firm does not allow its personnel (managers
and workers) to engage in, even though such behavior may not be unlawful. Unlawful
behavior, on the other hand, is behavior that is not allowed by law and which would be
punished under the legal system if engaged in. Thus, ethics is a source of guidance beyond
enforceable law. Being based on values, however, it is often not clear what ethical behavior is
and what it is not since different people may have different values. An ethic officer helps to
draw up the company’s ethical code and is responsible for seeing it enforced.

12. The government often allows only one telephone and electric power company in each area to
allow economies of large scale in production and lower costs per unit. But then it regulates
these companies to allow just enough (i.e., normal) return on investment to attract and retain
investments in the industry. Regulation is required to prevent these companies from using the
monopoly power conferred on them by the government to charge higher prices to consumers
and earn above normal return on investment (i.e., economic profits).

13. It is important to introduce an international dimension into the study of managerial economics
because many of the commodities that we consume today are imported, and American firms
purchase many inputs abroad, sell an increasing share of their output to other nations, and face
increasing competition from foreign firms operating in the United States. International flows of
capital, technology, and skilled labor have also reached unprecedented dimensions.

14. The danger and fear of terrorism increases the cost of doing business in order to pay for the
cost of security measures. It also increases insurance costs. In addition, it may restrict some
international trade and financial dealings with some countries and some foreign firms, and it
makes it more difficult and costly for a firm to hire foreign workers on temporary work visas.

15. The Internet is extremely useful for the study of managerial economics because it can be used
to provide a wealth of macro and micro information.
1. At $r = 5\%$, $PV = \frac{\$100}{(1 + 0.5)\r^1} = \frac{\$100}{1.05} = \$95.24$

At $r = 8\%$, $PV = \frac{\$100}{1.08}$

At $r = 10\%$, $PV = \frac{\$100}{1.10}$

At $r = 15\%$, $PV = \frac{\$100}{1.15}$

At $r = 20\%$, $PV = \frac{\$100}{1.20}$

At $r = 25\%$, $PV = \frac{\$100}{1.25}$

2. At $r = 5\%$, $PV = \frac{\$100}{(1 + 0.5)\r^2} = \frac{\$100}{(1.05)^2} = \frac{\$100}{1.1025} = \$90.70$

At $r = 8\%$, $PV = \frac{\$100}{(1.08)^2} = \frac{\$100}{1.1664}$

At $r = 10\%$, $PV = \frac{\$100}{(1.10)^2} = \frac{\$100}{1.21}$

At $r = 15\%$, $PV = \frac{\$100}{(1.15)^2} = \frac{\$100}{1.3225}$

At $r = 20\%$, $PV = \frac{\$100}{(1.20)^2} = \frac{\$100}{1.44}$

At $r = 25\%$, $PV = \frac{\$100}{(1.25)^2} = \frac{\$100}{1.5625}$
3. \( PV = \frac{$100}{(1.15)^1} + \frac{$100}{(1.15)^2} + \frac{$800}{(1.15)^2} \)

\[= \frac{$100}{1.15} + \frac{$100}{1.3225} + \frac{$800}{1.3225} \]

\[= $86.96 + $75.61 + $604.91 \]

\[= $767.48 \]

4. At \( r = 15\% \), \( \frac{$120}{1.15} = $104.35 \)

At \( r = 20\% \), \( \frac{$120}{1.20} = $100.00 \)

At \( r = 25\% \), \( \frac{$120}{1.25} = $96.00 \)

At \( r = 20\% \), the firm is indifferent between undertaking the advertising campaign or not because the present value of the return equals the cost. The firm should undertake the campaign if its rate of discount (\( r \)) is lower than 20\%, and it should not if its rate of discount is higher than 20\%.

5. Project 1: \( PV = \frac{$100,000}{1.10} + \frac{$100,000}{(1.10)^2} + \frac{$100,000}{(1.10)^3} + \frac{$100,000}{(1.10)^4} \)

\[= \frac{$100,000}{1.10} + \frac{$100,000}{1.21} + \frac{$100,000}{1.331} + \frac{$100,000}{1.4641} \]

\[= $316,986.55 \]

Project 2: \( PV = \frac{$75,000}{1.10} + \frac{$75,000}{(1.10)^2} + \frac{$75,000}{(1.10)^3} + \frac{$75,000}{(1.10)^4} \)

\[+ \frac{$75,000}{(1.10)^5} + \frac{$75,000}{(1.10)^6} \]

\[= $326,644.55 \]

The manager should choose project 2.
6. Project 1: \[ PV = \frac{100,000}{1.20} + \frac{100,000}{(1.20)^2} + \frac{100,000}{(1.20)^3} + \frac{100,000}{(1.20)^4} \]

\[ = \frac{258,873.45}{1.20} \]

Project 2: \[ PV = 249,413.26 \]

Thus, with a discount rate of 20%, the firm should choose project 1.

7. The present value of two investment projects depends on the timing of the receipts and on the discount rate. At the discount rate of 10%, project 2 has a higher present value. At the discount rate of 20%, project 1 has a higher present value.

Thus, the decrease in the present value with a higher discount rate is greater for project 2 than for project 1 because the expected profits from project 2 arise over a longer period of time than for project 1. That is, the decrease in present value arising from the longer period of time over which the profits are generated by project 2 is magnified by increasing the discount rate.

8. The explicit costs are $6,000 for tuition, plus $2,000 for the room, plus $1,500 for meals, plus $500 for books and supplies, for a total of $10,000 per year. The implicit costs are given by the sum of $15,000 which the student could have earned by getting a job instead of going to college and the $1,000 of interest foregone on the $10,000 of expenses for one year, for a total of $16,000.

The total economic cost of attending college for a year by this student equals the sum of its explicit costs of $10,000 and the implicit costs of $16,000, or $26,000.

9. (a) The explicit costs are $81,000.

(b) The implicit costs are equal to $25,000 (i.e., the entrepreneur’s foregone salary).

(c) The business profit equals total revenue minus the explicit costs, or $120,000 - $81,000 = $39,000.

(d) The economic profit equals total revenues minus the explicit and implicit costs, or $120,000 - $106,000 = $14,000.

(e) The normal return on investment equals the implicit costs of the entrepreneur (i.e., her salary foregone) of $25,000.
10. The statement is generally true. In the course of seeking to maximize profits or the value of the firm, business supplies the goods and services that society wants the most, provides employment, and pays taxes. Trying to superimpose on business additional explicit social responsibility goals on top of profit maximization will interfere with the allocative efficiency of the free-enterprise system.

It is true that society often wants to modify the operation of the economic system so as to achieve some explicit social goal (such as reducing the overall level of unemployment, hiring the handicapped, controlling pollution, etc.). But this can best be achieved through government regulations and incentives. Business can best contribute to the welfare of society if it is left to do what it does best—that is, to maximize profits.

As Adam Smith pointed out more than two centuries ago with his celebrated discussion of the invisible hand, when each individual (and manager) is left to pursue his own selfish aims, he also, and at the same time, promotes the welfare of society much more than he believes he does.

11. In attending college the student incurs explicit and implicit costs. The explicit costs include tuition and the expenditures for room, meals, and books and supplies. The implicit costs include the salary foregone by attending college rather than getting a job, plus the interest foregone on the explicit costs for one-half a year (on the assumption that the explicit expenditures for each semester are incurred at the beginning of the semester).

Aside from the psychic benefit of attending college, a college education will also result in a larger expected future stream of income over the working life of the college graduate.

Thus, the decision to attend college can be evaluated as any other investment decision, in terms of its benefits and costs. Using this method it was estimated that the return to a college education was about 10 percent to 15 percent per year during the 1950s and 1960s.

Since the early 1970s and as a result of sharp increases in tuition and relatively lower starting salaries, the return to a college education declined to about 7 to 8 percent per year. This is lower than on similarly risky investments. It must be pointed out, however, that part of what was considered the cost of attending college may in fact be regarded as consumption. When this is considered, the return on attending college may still be higher than on similarly risky ventures.

12. Computer firms remain in the industry even in the face of declining profits because they hope that they can make more profits in the future (as Dell has done in previous years) and the computer industry is the industry they know best. Over the years many computer companies have, indeed exited the industry or have discontinued making some computers (such as IBM dropping desktop computers in 2001).

13. See: http://www.fortune.com/companies, at the beginning of 2006 and 2007. The vast majority of the most admired global companies are likely to be American (as in previous years).
14. See the website for this text for Chapter 1.

15. (a) The business profit resulting from purchasing the pharmacy equals $200,000 in revenue minus the explicit costs of $80,000 for supplies, $40,000 for hired help, $10,000 for rent, $5,000 for utilities, and $8,000 for the interest on the bank loan of $80,000 at the rate of interest of 10 percent per year.

Thus, the business profit is $200,000 - $143,000 = $57,000.

The economic profit equals the revenue of $200,000 minus the explicit costs of $143,000 and the implicit costs of $40,000 (Semantha’s opportunity costs of managing another pharmacy) and $2,000 (the opportunity cost of using $20,000 of her own funds in the business). Thus, the economic profit is $15,000 and Semantha should purchase the pharmacy.

(b) For the economic profit to be zero, the revenue of the pharmacy would have to be $185,000 in four years. Then, revenue equals the total of explicit and implicit costs, and (economic) profit would be zero.

(c) The economic profit earned during the first three years of operation can be explained by the frictional theory of profit.

(d) Semantha should still purchase the pharmacy if the present value of the pharmacy exceeds zero at the discount rate of 15 percent. The present value of the pharmacy is calculated by considering the economic profit of $15,000 in each of the three years and the loss of $50,000 on the sale of the pharmacy at the end of the third year.

\[
PV = \frac{15,000}{1.15} + \frac{15,000}{(1.15)^2} + \frac{15,000}{(1.15)^3} - \frac{50,000}{(1.15)^3} \\
= 13,043.48 + 11,342.16 + 9,862.74 - 32,875.81 \\
= 1,372.57
\]

Since the present value of the pharmacy exceeds zero, Semantha should still purchase the pharmacy.
(a) For a line graph in Excel, first highlight columns B and C together including the column headings. Then choose Insert-Line, and select the first picture in the menu that appears. A graph will appear that looks like the following (the top line referring to age and the lower line to time):

![Graph showing age and time relationship](image)

(b) For part b, the process is the same as the first problem. All the calculations can be performed through Excel functions.

(c) For part C, use the covar function. In a cell, type “=covar(“. Once you type this, Excel will prompt you to highlight the first column of data. Move your mouse to highlight only the data in column B, then type a comma. Finally, highlight the data in column C and press “Enter.” You should get a value of -2.356. The covariance is negative, so it indicates that as the time to finish goes down, the age goes up.
CHAPTER 2
THE BASIC ECONOMIC MODEL: DEMAND, SUPPLY, AND EQUILIBRIUM

2-1 Market Analysis

2-2 Market Demand
Demand Schedule and Demand Curve
Changes in Demand

2-3 Market Supply
Supply Schedule and Supply Curve
Changes in Supply

2-4 When Is a Market in Equilibrium?
Case Study 2-1: Equilibrium Price by Auction

2-5 Adjustment to Changes in Demand and Supply: Comparative Static Analysis
Adjustment to Changes in Demand
Adjustment to Changes in Supply
Case Study 2-2: Changes in Demand and Supply and Coffee Prices

2-6 Domestic Demand and Supply, Imports, and Prices
Case Study 2-3: The Large US Automotive Trade Deficit Keeps US Auto Prices Down

2-7 Interfering With Versus Working Through the Market
Case Study 2-4: Rent Control—The Best Way to Destroy New York City!
Case Study 2-5: Is the US Farm Support Program on the Way Out?
Case Study 2-6: Working Through the Market with an Excise Tax
Case Study 2-7: Fighting the Drug War by Reducing Demand and Supply
Box 2 – Managerial Economics at Work: Noneclearing Financial and Other Markets

SUMMARY
DISCUSSION QUESTIONS
PROBLEMS
SPREADSHEET PROBLEMS
APPENDIX TO CHAPTER 2: THE ALGEBRA OF DEMAND, SUPPLY AND EQUILIBRIUM

Marker Equilibrium Algebraically
Shifts in Demand and Supply, and Equilibrium
The Effect of an Excise Tax

APPENDIX PROBLEMS
SUPPLEMENTARY READINGS
INTERNET SITE ADDRESSES
KEY TERMS (in the order of their appearance)

<table>
<thead>
<tr>
<th>Market</th>
<th>Auction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfectly competitive market</td>
<td>Comparative static analysis</td>
</tr>
<tr>
<td>Market demand schedule</td>
<td>Excess demand</td>
</tr>
<tr>
<td>Law of demand</td>
<td>Excess supply</td>
</tr>
<tr>
<td>Market demand curve</td>
<td>Price ceiling</td>
</tr>
<tr>
<td>Market supply schedule</td>
<td>Price floor</td>
</tr>
<tr>
<td>Market supply curve</td>
<td>Excise tax</td>
</tr>
<tr>
<td>Equilibrium price</td>
<td>Incidence of a tax</td>
</tr>
<tr>
<td>Surplus</td>
<td>Import tariff</td>
</tr>
<tr>
<td>Shortage</td>
<td>Nonclearing market</td>
</tr>
</tbody>
</table>
ANSWERS TO DISCUSSION QUESTIONS

1. The demand for a commodity increases (i.e., shifts to the right) with an increase in consumers’ incomes, with an increase in the price of substitute commodities, and with an increase in the number of consumers in the market. An increase in the price of complementary commodities will reduce the demand for the commodity.

2. A fall in the price of a commodity, holding everything else constant, results and is referred to as an increase in the quantity demanded.

3. When an individual’s income rises, while holding everything else the same, that person’s demand for a normal good increases or shifts to the right, so that the individual will demand more of the good at each price of the good.

4. If the supply curve is positively sloped, a rise in the price of the commodity leads to an increase in the quantity of the commodity.

5. (a) An improvement in technology shifts the supply curve to the right.

   (b) An increase in input prices shifts the supply curve to the left.

   (c) If both occur, the supply curve will shift to the right or to the left depending on the relative strength of the two opposing forces.

6. At Q=4, the price of $1.50 that consumers are willing to pay for the commodity (point C on the D curve) exceeds the price of $0.75 that producers require to supply 4 units of the commodity (point N on the S curve). As a result, producers will expand output to the equilibrium level of Q=6 (point E on the D and S curves), which is exactly equal to the quantity of the commodity that consumers are willing to purchase at P=$1.00.

7. At Q=8, the price of $1.25 that producers require to supply 8 units of the commodity (point K on the S curve) exceeds the price of $0.50 that consumers are willing to pay for the commodity (point G on the D curve). As a result, producers will reduce output to the equilibrium level of Q=6 (point E on the D and S curves), which is exactly equal to the quantity of the commodity that consumers are willing to purchase at P=$1.00.

8. An increase in both demand and supply leads to an increase in quantity, but the price can rise, fall, or remain unchanged depending on the size of the relative shift in the demand and supply curves.

9. At P_T=$1.50, the United States would want to import 450 million yards of textiles, while the rest of the world would like to export 150 million yards (see Panel B of Figure 2-9). Thus, the price of textiles increases. As it does, quantity of textile imports demanded by the United States decreases while the quantity of textile exports supplied by the rest of the world increases until the equilibrium price of $2 is reached at which QD= QS.
10. The price of textiles in the United States will exceed the price of textiles abroad by the cost of transportation of $1 per yard. A smaller quantity of textiles will then be traded.

11. Even though trade restrictions lead to higher consumer prices, governments usually impose trade restrictions to protect domestic jobs in sectors in which the country is less efficient than foreign producers.

12. (a) A price ceiling is effective only if it is below the equilibrium price. On the other hand, a price floor is effective only if it is above the equilibrium price.

(b) Rent control is an example of an effective price ceiling. Rent control laws resulted in a shortage of apartments and many other distortions in the housing market.

13. (a) One example of an effective price floor was the price support program in US agriculture. It resulted in huge farm surpluses and other distortions in US agriculture. The same is true for most other advanced nations.

14. It does not make any difference whether the tax is collected from buyers or sellers. The net after-tax price paid by buyers and the net after-tax price received by sellers are the same in either case.

15. The size of a prohibitive tariff in Figure 2-9 (in the absence of transportation costs) is $2 per year of textile imported. The reason is that the tariff of $2 per yard of imported textile makes the price of a year imported textile equal to the pretrade price of textiles in the United States, so that there is no reason to import foreign textiles (assuming that they are not of better quality).

ANSWERS TO PROBLEMS

1. By substituting \( P=\$6 \) into the demand equation or function, we get:
   \[ QD = 60 - 10(6) = 0. \]

   By substituting \( P=\$5 \) into the demand equation, we get:
   \[ QD = 60 - 10(5) = 10. \]

   If \( P=\$4 \), \( QD = 60 - 10(4) = 20. \)
   If \( P=\$3 \), \( QD = 60 - 10(3) = 30. \)
   If \( P=\$2 \), \( QD = 60 - 10(2) = 40. \)

   If \( P=\$1 \), \( QD = 60 - 10(1) = 50. \)
   If \( P=\$0 \), \( QD = 60 - 10(0) = 60. \)

   The above values for the quantity demanded are those given by the demand schedule.
2. 

<table>
<thead>
<tr>
<th>$P$ ($)</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>$QD$</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
</tr>
</tbody>
</table>

3. See Figure 1 on the next page.

$D'$ represents an increase in demand because consumers demand more of the commodity at each and every price.

4. (a) 

<table>
<thead>
<tr>
<th>$P_S$</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Q_S$</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

(b) 

<table>
<thead>
<tr>
<th>$P_S$</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Q_S$</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

(c) See Figure 2 on the next page.

(d) The shift from S to $S'$ (an increase in supply) may result from an improvement in technology, a reduction in the price of resources going into the production of the commodity, or more favorable weather (for an agricultural commodity).