Solutions for Macroeconomics 3rd Edition by OBrien

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Solutions

CHAPTER 1 | Economics: Foundations and Models

SOLUTIONS TO END-OF-CHAPTER EXERCISES

1.1 Three Key Economic Ideas

Learning Objective: Explain these three key economic ideas: People are rational; people respond to incentives; and optimal decisions are made at the margin.

Review Questions

1.1 "People are rational" is the assumption that decision makers explicitly or implicitly weigh the benefits and costs of each action and then choose an action only if the benefits are expected to outweigh the costs. "People respond to incentives" means that consumers and firms consistently respond to economic incentives. "Optimal decisions are made at the margin" means that most decisions are not "all or nothing" but involve doing a little more or a little less of an activity. Therefore, the optimal decision is to continue any activity up to the point where the marginal benefit equals the marginal cost.

1.2 Scarcity is the situation in which unlimited wants exceed the limited resources available to fulfill those wants. Economics is the study of the choices consumers, business managers, and government officials make to attain their goals. Scarcity is central to the study of economics because scarcity requires people to make choices about how to use their resources to best fulfill their wants.

Problems and Applications

1.3 As noted in the chapter, the economic incentive to banks is clear—it is less costly to put up with bank robberies than to take these additional security measures. The marginal cost of adding the additional security is greater than the expected marginal benefit.

1.4 **a**. Students face scarcity of time, like everyone else, and respond to the incentives of the teacher's grading system. Students have more incentive to direct their efforts into the parts of the course that have the most weight in the grading system.

b. Too little weight on outside readings or the like gives students little incentive to read and master the material. Students will put less effort in the parts of the course that have little effect on their grades.

c. Quizzes over assigned readings would give students an incentive to come to class having read the upcoming material. Some teachers give preparation assignments where students have to read and answer questions about the upcoming material, and over the course of the semester students have to successfully complete a certain percentage of the preparation assignments to qualify for an A, or B, or other grade in the course.

1.5 The carbon price and the subsequent increase in the price of gasoline (and other carbon-intensive products) will encourage people to use less gasoline. If people respond to the negative incentive of higher gas prices by using less gas, maybe by taking the bus or buying a more fuel-efficient car, we will emit fewer greenhouse gases and do less damage to the environment.

1.6 **a.** In deciding whether or not to go to the gym on a specific day, most people aren't comparing the benefits of an active lifestyle and the cost of the gym membership. They're comparing what they stand to miss out on and the relatively small benefit any single workout will have on their overall health. By implementing a simple payment system, the researchers increase the benefit of a small number of trips to the gym. Further thought: The benefits of going to the gym tend to materialize over a long time after the decision to go to the gym is made. Some of those benefits will be received years into the future. By offering cash payments in the relatively near term, the researchers offer a benefit that can be received in the same time frame as the costs of going to the gym are paid.

b. Those who do not respond to the monetary incentive to go to the gym clearly value their other options more than the health benefits and monetary reward received by going to the gym. Consider a student who is working to pay for their education. The payment received by going to the gym is likely less than the payment received by going to work. In short, the incentive isn't big enough.

1.7 Jill is correct. The difference between the grade before and after watching an extra episode is exactly the same as knowing the change in the grade.

1.8 Your friend is failing to think at the margin. It doesn't matter how much time your friend has already spent studying psychology. What matters is the marginal benefit to be received from studying psychology relative to the marginal cost, where cost is measured as the opportunity cost of lower grades in other subjects. If the course is required to graduate, that may raise the marginal benefit associated with completing the course.

1.2 The Economic Problems All Societies Must Solve

Learning Objective: Discuss how a society answers these three key economic questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

Review Questions

2.1 Scarcity implies that every society and every individual faces trade-offs because wants are unlimited, but the ability to satisfy those wants is limited. Societies and individuals cannot have everything they want, so they have to make choices about what to have and what not to have.

2.2 The three economic questions that every society must answer are: 1) What goods and services will be produced? 2) How will the goods and services be produced? 3) Who will receive the goods and services produced? In a centrally planned economy, the government makes most of these decisions. In a pure market economy, almost all of these decisions are made by the decentralized interaction of households and firms in markets. In a mixed economy, most economic decisions result from the interaction of buyers and sellers in markets, but the government plays a significant role in the allocation of resources.

2.3 Productive efficiency occurs when a good or service is produced at the lowest possible cost. Allocative efficiency means that what is produced reflects consumer preferences—every good or service is produced up to the point at which the last unit provides a marginal benefit to consumers equal to the marginal cost of producing it.

2.4 Efficiency is concerned with producing the goods and services that people want at the lowest cost. Equity is "fairness," a concept that can differ from person to person. Government policymakers often want to make economic outcomes "fairer," but doing so usually involves redistributing income from one group to another. Redistributing income usually (but not always) hampers efficiency because it reduces incentives to produce and drives up production costs.

Problems and Applications

2.5 Yes, even Bill Gates faces scarcity because his wants exceed his resources. First, Gates has established a foundation with billions of dollars to spend on worthy causes like eradicating malaria and reducing homelessness. However, there are an unlimited number of worthy causes that Gates can fund, so even he faces scarcity. Second, even Gates has only 24 hours in a day, so he must make choices about how to spend his scarce time. Everyone faces scarcity, because human desires are virtually unlimited. Because the world's resources are limited, the only way not to face scarcity would be to reduce your wants to be fewer than what your resources can accomplish.

2.6 **a.** It is doubtful that centrally planned economies have been less efficient purely by chance. The underlying reason seems to be that centrally planned economies don't provide as strong incentives for hard work and innovation as market economies do. In addition, the people running centrally planned economies cannot make the most efficient decisions because they don't have the information that is in the minds of all the decentralized decision makers in a market economy.

b. You might still prefer having a centrally planned economy if you considered it to be more equitable. (Also, you might prefer a centrally planned economy if you were in charge.)

2.7 A complete explanation for the connection between majoring in economics and succeeding in business or government leadership would involve many factors. But we can say that economics teaches us how to look at the trade-offs involved in every decision we make. Those who cannot understand the costs of an action and weigh them against its benefits are unlikely to make good decisions. Climbing the corporate or governmental ladder requires making a wider and wider array of such decisions.

2.8 **a.** The groups of students most likely to try to get the tickets will be those for whom the expected marginal benefit of going to the athletic department's office on Monday morning is greater than the expected marginal cost. These would include students who have a relatively low opportunity cost of their time, such as those who have no Monday morning classes. Other students who are likely to stand in line are those who would have a large benefit from getting the tickets: Those who love hockey and those who hope to sell their tickets ("scalpers").

b. The major opportunity cost of distributing the tickets this way is the cost to those students who attempt to get the tickets: The costs of missing out on the activities that cannot be done while standing in line, and the costs to those people who try to get tickets but don't arrive soon enough to do so. There's also the cost of the lost revenue to the college from giving away the tickets instead of selling them.

c. This isn't an efficient way to distribute the tickets because it wastes a lot of time. It would be more efficient to sell the tickets to those willing to pay the highest prices.

d. Equity is hard to define. Some people will see this way of distributing tickets as equitable because students with low incomes can still get tickets, provided they are willing to pay the opportunity cost of waiting in line. Some people will see this way of distributing the tickets as

equitable because only those with the greatest desire to watch the game in person will put up with the hassle of getting the tickets. Some people might argue that this system is equitable because students are more deserving than nonstudent recipients of the tickets. Others may disagree, saying that people with a strong desire to obtain the tickets, but who are unable to be at the athletic department's office at the designated time, would have no chance to get the tickets. Still others could argue that the system is not equitable because no revenue is received for the tickets—revenue that could be used to cover some of the costs of administering the university's athletic programs.

1.3 Economic Models

Learning Objective: Understand what economic models are and aren't, and why they are a good idea.

Review Questions

3.1 Economists use models for the same reason that any other scientist (and indeed everyone else) does—to make a complicated world simple enough that it can be understood and analyzed, so that questions about it can be usefully answered. Useful models will generate testable predictions. If these predictions are consistent with economic data, then the model isn't rejected and can be used to understand the economy. Testing models with data can be very difficult, however, because the economy is always changing, and it is difficult to conduct controlled economic experiments.

3.2 In arriving at a useful economic model, these five steps are followed: 1) decide the assumptions to be used; 2) formulate a testable hypothesis; 3) use economic data to test the hypothesis; 4) revise the model if it fails to explain the economic data; and 5) retain the revised model to help answer similar economic questions in the future.

3.3 Positive economic analysis concerns what is; that is, it deals with how the economy actually behaves. Normative economic analysis concerns what ought to be. Economics is mainly concerned with positive analysis—conceptualizing and measuring the costs and benefits of different courses of action. Decision makers (including voters and government officials) can use the trade-offs and costs and benefits identified by positive economic analysis in normatively deciding what course of action should be taken.

Problems and Applications

3.4 The economist should revise the model in light of its failure to explain or predict real-world events.

3.5 The problem with Dr. Strangelove's theory is that it cannot be tested unless we can devise a way to measure the emission of these subatomic particles, which seems to be impossible because they don't exist in our universe. Because we cannot test the model's predictions, it is not very useful to us; even though it might be true, we have no way of knowing.

3.6 The economic data that would be most useful would be to identify those who are unemployed due (largely) to the increase in the minimum wage and to identify those who are able to enjoy the improved income resulting from increased wages. Understanding the number and nature of those who lose and those who gain can help us understand the positive side of the issue. Unfortunately,

this data will not resolve the normative side of the data debate, as the normative side of the debate requires people to make an assessment of which group is more important.

3.7 **a.** Tim Hortons and other coffee shops will likely respond to the reduction in the amount of coffee available by increasing the price they charge their customers.

b. Centrally planned economies tend to deal with shortages in two different ways. First, when goods are scarce in centrally planned economies, the central planning committee rations the scarce resource by either issuing a small share to each person or restricting the amount any one person is allowed to buy at a time. Second, consumers are often required to wait in long lines to get the scarce goods. By requiring that someone wait in line for hours in order to receive their ration of coffee, central planners are effectively raising the cost of coffee to consumers—some consumers will choose to give up their coffee rather than wait in line.

3.8. **a. and c**. are positive statements; **b. and d.** are normative statements.

1.4 Microeconomics and Macroeconomics

Learning Objective: Distinguish between microeconomics and macroeconomics.

Review Questions

4.1 Microeconomics is the study of how households and firms make choices, how they interact in specific markets, and how the government influences their choices. "Micro" means small, and microeconomics deals with individual decision makers. Macroeconomics is the study of the economy as a whole. "Macro" means large, and macroeconomics deals with economy-wide outcomes, such as the inflation rate, the unemployment rate, and the economic growth rate.

4.2 No, because many economic situations have both a microeconomic and a macroeconomic aspect. For example, the level of total consumption spending by households helps to determine how fast the economy grows—which is a macroeconomic issue. But to understand the amount of consumption spending by households, we have to analyze the incentives and constraints individual households face—which is a microeconomic issue.

Problems and Applications

4.3 a. and d. are microeconomic issues; b. and c. are macroeconomic issues.

4.4 You should disagree with the assertion. Microeconomics deals with individual decision makers, while macroeconomics deals with economy-wide outcomes. Because the unemployment rate in any one city would be an issue for the economy of the entire city and not an individual, it is a macroeconomic issue rather than a microeconomic issue. The effect of an increase in the taxes on alcohol on underage drinking concerns underage individuals who drink alcohol, so it is a microeconomic issue rather than a macroeconomic issue.

Suggestions for *Critical Thinking Exercises*

CT1.1 Clearly, answers to this question will vary substantially and will depend upon the background of the student. The main point is not correctness but to help students connect the chapter to their prior knowledge. This is difficult for an instructor to evaluate. By connecting to their prior knowledge, students should be able to learn this topic more deeply.

CT1.2 The key here is what incentive(s) you need to put in place to encourage yourself and your team to train harder or more often. Also, keep in mind that this article suggests that the training is already in progress, so it is also about additional training, or marginal analysis. Simply put, what can you do to make sure you train for an *extra* hour or session? Or to make sure you work a little bit hard in your next previously scheduled training session.

SOLUTIONS TO CHAPTER 1 APPENDIX

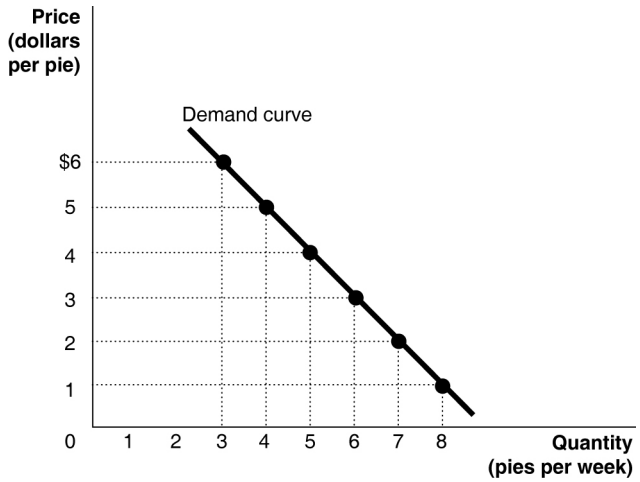
A-1 Using Graphs and Formulas

Learning Objective: Review the use of graphs and formulas

Problems and Applications

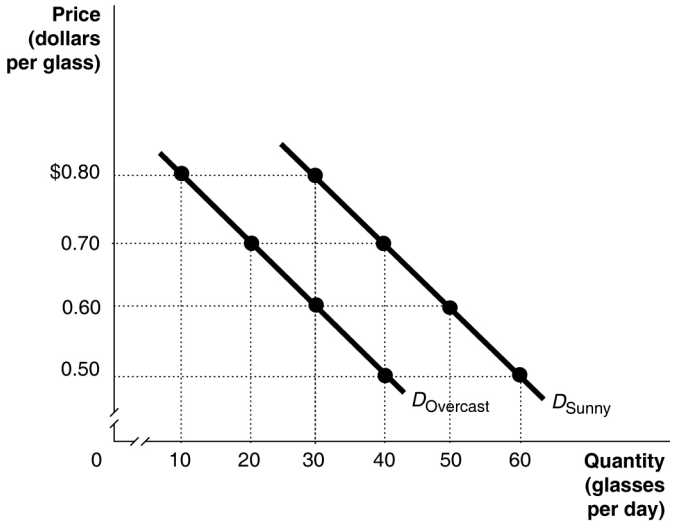
1A.1 a. The relationship is negative because as price decreases, the quantity of pies purchased increases.

b.



c. The slope = $\Delta y/\Delta x$ = rise/run = $-1/1 = -1$.

1A.2



1A.3 Answers will vary somewhat depending on the values determined from the time-series graph. The calculations below use Ford sales rounded to the nearest millions as shown in the table below.

Year	Ford's Auto Sales (in millions of dollars)
2005	6.8
2006	6.6
2007	6.6
2008	5.4
2009	4.9
2010	5.5
2011	5.7
2012	5.7
2013	6.3
2014	6.3
2015	6.6
2016	6.7

Year	Percentage Change
2006	$[(6.6 - 6.8)/6.8] \times 100 = -2.9\%$
2007	$[(6.6 - 6.6)/6.6] \times 100 = 0.0\%$
2008	$[(5.4 - 6.6)/6.6] \times 100 = -18.2\%$
2009	$[(4.9 - 5.4)/5.4] \times 100 = -9.3\%$
2010	$[(5.5 - 4.9)/4.9] \times 100 = 12.2\%$
2011	$[(5.7 - 5.5)/5.5] \times 100 = 3.6\%$
2012	$[(5.7 - 5.7)/5.7] \times 100 = 0.0\%$
2013	$[(6.3 - 5.7)/5.7] \times 100 = 10.5\%$
2014	$[(6.3 - 6.3)/6.3] \times 100 = 0.0\%$
2015	$[(6.6 - 6.3)/6.3] \times 100 = 4.8\%$
2016	$[(6.7 - 6.6)/6.6] \times 100 = 1.5\%$

We can conclude that sales fell at the highest rate in 2008.

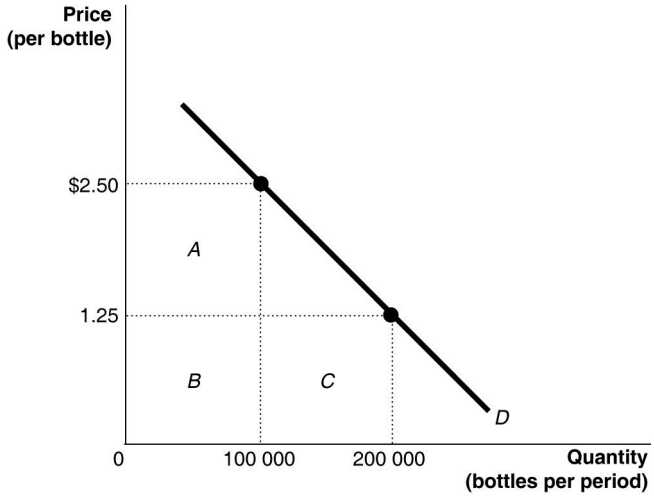
1A.4 Percentage change in real GDP:

[($16 397 billion − $15 982 billion)/$15 982 billion] × 100 = 2.6%

The percentage change in real GDP from one year to the next is the economy's growth rate.

1A.5

a.



b. At $2.50 per bottle, the total revenue equals rectangles $A + B$ = $250 000 (because $2.50 × 100 000 = $250 000). At $1.25 per bottle, the total revenue equals rectangles $B + C$ = $250 000 (because $1.25 × 200 000 = $250 000).

1A.6 The triangle's area = 0.5 × 60 000 × $0.75 = $22 500.

1A.7 The slope is calculated using the formula:

$$\text{Slope} = \frac{\text{Change in value on the vertical axis}}{\text{Change in value on the horizontal axis}} = \frac{\Delta y}{\Delta x} = \frac{\text{Rise}}{\text{Run}}.$$

At point A: rise = 300 − 175 = 125, run = 7 − 5 = 2. Therefore, the slope = 125/2 = 62.5.

At point B: rise = 900 − 700 = 200, run = 14 – 12 = 2. Therefore, the slope = 200/2 = 100.

CHAPTER 1 | Economics: Foundations and Models

Brief Chapter Summary and Learning Objectives

1.1 Three Key Economic Ideas (pages 3–6)

Explain these three key economic ideas: People are rational. People respond to incentives. Optimal decisions are made at the margin.

- People must make choices as they try to attain their goals. People make choices because resources are scarce. Most of economics analyzes what happens in markets.

1.2 The Economic Problem All Societies Must Solve (pages 6–10)

Discuss how a society answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

- A limited amount of resources can produce a limited amount of goods and services.
- The cost of producing more of one good is the value of what must be given up to produce it.

1.3 Economic Models (pages 10–13)

Understand what economic models are and aren't, and why they are a good idea.

- Economists use models—simplified versions of reality—to analyze real-world issues.
- Economists accept a model if it leads to hypotheses that are confirmed by statistical analysis.

1.4 Microeconomics and Macroeconomics (pages 13-14)

Distinguish between microeconomics and macroeconomics.

1.5 The Language of Economics (pages 14–15)

Define important economic terms. (It's not *all* Greek.)

Appendix A: Using Graphs and Formulas (pages 21–32)

Review the use of graphs and formulas.

Key Terms

Allocative efficiency, p. 9. A state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to society equal to the marginal cost of producing it.

Centrally planned economy, p. 7. An economy in which the government decides how economic resources will be allocated.

Economic model, p. 3. A simplified version of reality used to analyze real-world economic situations.

Economic variable, p. 11. Something measurable that can have different values, such as the price of coffee.

Economics, p. 2. The study of the choices people make to attain their goals, given their scarce resources.

Equity, p. 9. The fair distribution of economic benefits.

Macroeconomics, p. 14. The study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

Marginal analysis, p. 5. Analysis that involves comparing marginal benefits and marginal costs.

Market, p. 3. A group of buyers and sellers of a good or service and the institutions or arrangements by which they come together to trade.

Market economy, p.8. An economy in which the decisions of households and firms interacting in markets allocate economic resources.

Microeconomics, p. 13. The study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

Mixed economy, p. 9. An economy in which most economic decisions result from the interaction of buyers and sellers in markets, but in which the government plays a significant role in the allocation of resources.

Normative analysis, p. 12. Analysis concerned with what ought to be.

Opportunity cost, p. 6. The highest-valued alternative that must be given up to engage in an activity.

Positive analysis, p. 12. Analysis concerned with what is.

Productive efficiency, p. 9. A situation in which a good or service is produced at the lowest possible cost.

Scarcity, p. 2. A situation in which unlimited wants exceed the limited resources available to fulfill those wants.

Trade-off, p. 6. The idea that, because of scarcity, producing more of one good or service means producing less of another good or service.

Voluntary exchange, p. 9. A situation that occurs in markets when both the buyer and seller of a product are made better off by the transaction.

Chapter Outline

You versus Caffeine

If you are like 65 percent of Canadians, you had a cup of coffee this morning—you might even be drinking one now. The simple pleasure of a cup of coffee is brought to you by hundreds of people working in a variety of occupations. Someone planted coffee, someone picked it and someone else took it to a port. A dockworker loaded a ship and a ship's crew transported the beans to North America. More dock workers, shippers, roasters, packagers, more shippers, retail store workers or baristas and finally you get a cup of coffee. All this happens through the complexities of the markets. Any disturbance in this sequence can change how much you pay. For example, changes in weather patterns or crop yield can change what all Canadians have to pay for their morning cup. Economics helps explain how markets work and what determines prices.
Source: International Coffee Organization http://www.ico.org/coffee_prices.asp.

Teaching Tips

There are special features that open and close each chapter of the book:

1. The introduction, or chapter opener, uses a real-world business example to preview the economic issues discussed in the chapter.

2. A boxed feature titled *Economics in Your Life and Career* complements the business example that opens the chapter. *Economics in Your Life and Career* poses questions that help students make a personal connection with the chapter theme. At the end of the chapter, the authors use the concepts described in the chapter to answer these questions.

You can use these features—the chapter opener and *Economics in Your Life and Career* —as the basis for classroom discussion, homework assignments, and examination questions. This Instructor's Manual includes one extra *Economics in Your Life and Career* for each chapter so that you can present material in class that is different from the material found in the textbook.

People must make choices as they try to attain their goals. The choices people make represent the trade-offs made necessary by scarcity. **Scarcity** is a situation in which unlimited wants exceed the limited resources available to fulfill those wants. **Economics** is the study of the choices people make to attain their goals, given their scarce resources. An **economic model** is a simplified version of reality used to analyze real-world economic situations.

Teaching Tips

It is important to define economics and explain what scarcity means at the beginning of the course, especially because many students will not have studied economics previously. Some students will better understand what scarcity means if you give them examples of things that are not scarce. You can provide examples of "free resources"—sand on a beach, fresh air—and ask students to contribute their own examples. Your students will quickly learn that the list of free resources is very much shorter than the list of scarce resources.

1.1 Three Key Economic Ideas (pages 3–6)

Learning Objective: Explain these three key economic ideas: People are rational, people respond to incentives, and optimal decisions are made at the margin.

A **market** is a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade. There are three important ideas students should learn to understand how people make choices and interact in markets: People are rational; people respond to economic incentives; and optimal decisions are made at the margin.

A. People Are Rational

This assumption does not mean that everyone knows everything or always makes the "best" decision. Rational individuals weigh the benefits and costs of each action and choose an action if the benefits outweigh the costs. When deciding, people believe it is their best interest; they may be wrong.

B. People Respond to Economic Incentives

Economists emphasize that consumers and firms consistently respond to economic incentives. When incentives change, people's actions change accordingly.

C. Optimal Decisions Are Made at the Margin

Economists use the word marginal to mean an extra or additional benefit or cost of a decision. The optimal decision is to continue any activity to the point where the marginal benefit equals the marginal cost. **Marginal analysis** involves comparing marginal benefits and marginal costs.

Teaching Tips

You don't need to spend a lot of class time with explanations because subsequent chapters will reinforce students' understanding of what markets are and the "three key economic ideas." This section of the chapter includes a *Solved Problem* that shows the step-by-step process of solving an economic problem related to a chapter learning objective. *Solved Problem 1.1* is an example of marginal analysis: whether a student should study an extra hour or watch an episode of favourite show on Netflix. You can work through the *Solved Problem* in class and assign the related end-of-chapter problems as homework. This Instructor's Manual includes some *Extra Apply the Concept* features and *Extra Solved Problems* that are not in the text so that you have unique problems to present in class or to assign as homework.

1.2 The Economic Problems All Societies Must Solve (pages 6–10)

Learning Objective: Discuss how a society answers these three economic questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

Every society faces the economic problem that it has only a limited amount of economic resources, and so it can produce only a limited amount of goods and services. Society faces trade-offs. A **trade-off** is the idea that because of scarcity, producing more of one good or service means producing less of another good or service. Every activity has an **opportunity cost,** which is the highest-valued alternative that must be given up to engage in an activity. Trade-offs force society to answer three fundamental questions:

What goods and services will be produced?

How will the goods and services be produced?

Who will receive the goods and services produced?

A. What Goods and Services Will Be Produced?

The answer to this question is determined by the choices consumers, firms, and the government make. Each choice made comes with an opportunity cost, measured by the value of the best alternative given up.

B. How Will the Goods and Services Be Produced?

Firms choose how to produce the goods and services they sell. For example, firms often face trade-offs between using more workers and using more machines.

C. Who Will Receive the Goods and Services Produced?

In Canada, who receives the goods and services produced depends largely on how income is distributed. An important policy question is whether the government should intervene to make the distribution of income more equal. The debate over how much taxation and government spending is appropriate will continue as long as societies must address the three fundamental questions.

D. Centrally Planned Economies versus Market Economies

Societies organize their economies in two main ways. A **centrally planned economy** is an economy in which the government decides how economic resources will be allocated. A **market economy** is an economy in which the decisions of households and firms interacting in markets allocate economic resources. Today, only a few small countries, such as Laos and North Korea, still have completely centrally planned economies. In a market economy, your income is determined by the payments you receive for what you sell. Markets usually reward hard work. Generally, the more extensive the training you have and the more hours you work, the higher your income will be.

E. The Modern "Mixed" Economy

Some government intervention is designed to raise the incomes of the elderly, the sick, and people with limited skills. Some economists argue that government intervention makes it more accurate to refer to the economies of Canada and most other countries as mixed economies rather than market economies. In a **mixed economy,** most economic decisions result from the interaction of buyers and sellers in markets, but the government plays a significant role in the allocation of resources. Even the United States and China are mixed economies that rely on a combination of both the market and central planning to provide people with a variety of goods and services. Although China remains a political dictatorship, production of most goods is determined in markets.

F. Efficiency and Equity

Market economies tend to be more efficient than centrally planned economies. There are two types of efficiency. **Productive efficiency** is a situation in which a good or service is produced at the lowest possible cost. **Allocative efficiency** is a state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to society equal to the marginal cost of producing it. **Voluntary exchange** is a situation that occurs in markets when both the buyer and seller of a product are made better off by the transaction.

Markets promote efficiency but don't guarantee it. Inefficiency arises from various sources. Governments can alter the level of efficiency in a market. Sometimes governments may reduce efficiency by interfering with voluntary exchanges in markets. The production of some goods may damage the environment when firms ignore the costs of environmental damage. In this case, government intervention can increase efficiency.

Society may not find an efficient economic outcome to be desirable. Many people prefer economic outcomes that they consider fair or equitable even if these outcomes are less efficient. **Equity** is the fair distribution of economic benefits. Equity is harder to define than efficiency. Programs designed to increase equity may reduce efficiency.

Teaching Tips

Ask students for examples of government regulation of private markets in Canada. Responses may include: making the sale of cocaine and narcotics illegal; minimum age requirements for the purchase of alcoholic beverages and cigarettes; or the prohibition of the sale of new drugs before their effectiveness is demonstrated through government supervised tests. Ask students whether one of these examples of government regulation promotes equity or fairness. The difficulty in defining equity will soon become apparent.

To show how students may value equity less than they claim, an economics teacher at a college in Western New York once told her students at the beginning of her course that their grades would be auctioned to the highest bidders. Because grades are typically normally distributed, she offered to sell a few A grades, a few more B grades, and so on. Although the announcement produced shock and grumbling, the auction proceeded, with frenzied bidding for A grades. As prices for A grades rose, bidding switched to B grades. Because few students bothered to bid for C grades, one enterprising student bid on several such grades in the belief that those who lost out on getting an A or B would have to buy their C grades from him—for a higher price than he paid! After about a week, the instructor informed the class the auction was intended only as an economics lesson; they would have to earn their grades the old-fashioned way!

Extra Solved Problem 1.2

Advising New Government Leaders

Suppose that a low-income country experiences a change in government leadership. Prior to this change, the country had a centrally planned economy. The new leaders are willing to try a different system if someone can convince them that it will yield better results. They hire an economist from a country with a market economy to advise them and will order their citizens to follow the economist's recommendations for change. The economist suggests that a market economy replace central planning to answer the nation's economic questions (what, how, and who).

What will the economist suggest the leaders order their citizens to do in order to change from a centrally planned economy to a market economy?

Are there reasons why the leaders and citizens of this country might not accept the economist's suggestions? Briefly explain.

Solving the Problem

Step 1: **Review the chapter material.**

The problem is about different types of economic systems, so you may want to review the section "Centrally Planned Economies versus Market Economies" on pages 7-8 of the textbook.

Step 2: **What will the economist suggest the leaders order their citizens to do?**

Market economies allow members of households to select occupations and purchase goods and services based on self-interest and allow privately owned firms to produce goods and services based on their self-interests. Therefore, the economist would advise the leaders of the poor country to not issue any orders. Government officials should have no influence over individual decisions made in markets.

Step 3: **Do you believe the leaders and citizens will accept the economist's suggestions?** Even democratically elected leaders, especially those with significant government involvement in the country's resource allocation, will find it difficult to accept the new system. They may wonder how self-interested individuals will produce and distribute goods and services so as to promote the welfare of the entire country. This new system requires a significant reduction in government influence in people's lives, but history has shown that government officials are often reluctant to give up this influence. Acceptance is most likely when the leaders have some knowledge and experience with the successful operation of a market economy in other countries. Ordinary citizens are more likely to accept the economist's suggestions because they will have more freedom to pursue their own economic goals.

Extra Apply the Concept

It's Saturday Afternoon: Why Aren't You at the Game?

For many students in the United States, attending college football games is an enjoyable way to spend Saturday afternoons in the fall. However, some colleges have experienced a decline in the number of students attending their games. In 2016, average attendance at the 130 schools that make up the Division I Football Bowl Subdivision (43,106) was the lowest since 2000 (42,631).

What explains the decrease in the number of students willing to attend football games? Rising ticket prices are one reason for the decline. One student at the University of Michigan was quoted as saying: "People are looking to trim costs, and for a lot of folks, football is an easy thing to cut. It's not essential to going to college."

Remember that the opportunity cost of engaging in an activity is the value of the best alternative that must be given up to engage in that activity. The opportunity cost of attending a college football game is *not* just the price of a ticket. If the price of a ticket to a game is $50, your opportunity cost is the ticket price *plus* the value you place on what else you could do if you don't attend the game. At one time, relatively few college football games were televised, but today multiple cable networks broadcast games. If you attend your college's games, you miss the opportunity to watch the games being broadcast at the same time—in high-definition with replays shown from multiple camera angles and expert commentary to clarify what is happening. When watching games in your room or at a sports restaurant, you can also post to Facebook, Instagram, or Twitter, read e-mail, surf the Web, and take or receive phone calls. Wi-Fi and cellular reception is often poor in college stadiums, making these activities difficult.

So the opportunity cost of attending college football games has increased in recent years, not just because ticket prices have risen but because the number of alternative activities that students value highly has also increased. We expect that when the opportunity cost of engaging in an activity increases, people will engage in that activity less, as we've seen with student attendance at college football games.

Colleges have responded to declining student attendance by reducing ticket prices, improving Wi-Fi and cellular service, and installing high-definition video boards that show replays as they appear on television. Whether these attempts to lower the opportunity cost of attending college football games will succeed remains to be seen.

Sources: Jon Solomon, "College Attendance in 2016: Crowds Decline for the Sixth Straight Year," *CBSSports.com*, December 16, 2016; Adam Rittenberg, "Attendance Challenges Big Deal for B1G," espn.com, February 14, 2014; and Ben Cohen, "At College Football Games, Student Sections Likely to Have Empty Seats," *Wall Street Journal*, August 27, 2014.

1.3 Economic Models (pages 10–13)

Learning Objective: Understand what economic models are and aren't, and why they are a good idea.

Models are simplified versions of reality used to analyze real-world situations. To develop a model, economists generally follow five steps.

1. Decide on the assumptions to use in developing the model.
2. Formulate a testable hypothesis.
3. Use economic data to test the hypothesis.

4. Revise the model if it fails to explain well the economic data.
5. Retain the revised model to help answer similar economic questions in the future.

A. The Role of Assumptions in Economic Models

Models are based on making assumptions because models must be simplified to be useful. For example, when using models, economists make behavioural assumptions about the motives of consumers and firms. Economists assume consumers will buy goods and services that will maximize their satisfaction. Economists assume that firms act to maximize their profits.

B. Forming and Testing Hypotheses in Economic Models

An **economic variable** is something measurable that can have different values, such as the price of coffee in Canada. A hypothesis in an economic model is a statement that may be correct or incorrect about an economic variable. We must test a hypothesis before we can accept it. To test a hypothesis, we analyze statistics on the relevant economic variables. Economists accept and use an economic model if it leads to hypotheses that are confirmed by statistical analysis.

C. Normative and Positive Analysis

Positive analysis is analysis concerned with what is. **Normative analysis** is analysis concerned with what ought to be.

D. Economics as a Social Science

Because economics studies the actions of individuals, it is a social science. Economics considers human behaviour in every context, not just in the context of business. Economists have played an important role in formulating government policies in areas such as the environment, health care, and poverty.

Extra Solved Problem 1.3

Snowfalls and Skiing

Marsha Shawn is a university student and downhill skier who lives near The Ski Chalet, a ski resort located in B.C.. For a course project Marsha and four other students are required to develop an economic model. Marsha suggests that their model test the impact of snowfalls on the sale of ski equipment (skis, boots, poles) and snowboards at the six ski shops located within a ten kilometre radius of The Ski Chalet. Marsha and the other students in her group agree that to have an impact on equipment sales a snowfall would have to result in at least four inches of new snow. How would you recommend that Marsha and the other students develop their model? Suggest an alternative model for Marsha in the event that the model fails to explain the data she uses to test her model.

Solving the Problem

Step 1: Review the chapter material.
The problem is about how to use models to analyze economic issues, so you may want to review the section "Economic Models," which begins on page 10 of the textbook.

Step 2: To develop and test a model of the relationship between snowfall and sales of ski equipment the students in Marsha's group should follow these steps:

1. *Decide on the assumptions to use in developing the model*. For example: sales of ski equipment and snowboards are greater after snowfalls (four or more inches) than are sales at other times during the period that The Ski Chalet is open.
2. *Formulate a testable hypothesis*. Sales of ski equipment and snowboards at the six ski shops located near the Ski Chalet are higher (for example, by 5 percent or more) within one week following snowfalls of four or more inches than other weeks that The Ski Chalet is open.
3. *Use economic data to test the hypothesis*. Marsha's group must obtain sales data from the six ski shops and agree on the number of observations (especially the number of times a snowfall of at least four inches is observed) required to test their hypothesis.
4. *Revise the model if it fails to explain the economic data well. Suggest an alternative model.* The model could fail if large number of skiers and snowboard owners buy their equipment prior to the months that The Ski Chalet is open, or if large numbers rent, rather than purchase, their equipment. One alternative model would compare the sales of lift tickets or rental equipment in weeks following snowfalls of four or more inches and other weeks during the time The Ski Chalet is open.
5. *Retain the revised model to help answer similar economic questions in the future*. If the data support the model, one can assume that there is a relationship between snowfalls and equipment sales. Tests of the model with data from different time periods or in different locations could either support or refute these results. Acceptance of a model is always tentative pending the acquisition of new data or additional statistical analysis.

1.4 Microeconomics and Macroeconomics (pages 13-14)

Learning Objective: Distinguish between microeconomics and macroeconomics.

Microeconomics is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

Extra Solved Problem 1.4

Microeconomic and Macroeconomic Views

Sports fans are used to seeing game action on television from different camera angles. For popular events such as the Olympics, the World Series, and the Super Bowl, network coverage captures action from ground level as well as from higher locations. At some events, there is a camera located in a blimp that circles above the stadium where the event is held. The aerial view of the blimp's camera is often visually appealing but is never broadcast for very long because the athletes are barely visible. Coverage of the events often includes a view from a mobile or "sideline" camera that can zoom in on individual players or fans sitting

in the stands, a degree of detail much greater than that provided by the aerial view. How do the different camera angles help to explain the difference between microeconomics and macroeconomics?

Solving the Problem

Step 1: **Review the chapter material.**
The problem concerns the differences between microeconomics and macroeconomics, so you may want to review the section "Microeconomics and Macroeconomics," which appears on pages 13-14 of the textbook.

Step 2: **Compare the focus of microeconomics with the television coverage of a sports event.**
Microeconomics focuses on how individual households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. This focus is similar to that of a sideline camera at a football game. The camera can focus in on an individual player or fan.

Step 3: **Compare the focus of macroeconomics with the television coverage of a sports event.**
Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth. Macroeconomics does not study the decisions made by individuals but the consequences of the actions of all decision makers in an economy. This is similar to the blimp's aerial view of the venue where a sports event occurs. One can see the entire venue, but the blimp's point of view is too far away to see any individual player or fan.

Extra Apply the Concept | Macroeconomic and Microeconomic Analysis

Economists separate the study of how households and firms make choices and interact in markets (microeconomics) from the study of the economy as a whole (macroeconomics). But some issues can be viewed from both perspectives. Labour productivity is one such issue.

Labour productivity—the quantity of goods and services that can be produced by one worker or by one hour of work—is a microeconomic topic. Labour productivity increases when a firm invests in capital or when a firm's technology improves. Increased labour productivity allows a firm to earn higher profits and to pay its workers higher wages.

Macroeconomists also study labour productivity because it determines the standard of living a country can achieve for its citizens. An increase in productivity is beneficial in the long run, but it can slow the growth of jobs in the short run. During the post-WWII economic expansion from 1950 to 1972, Canada experienced an average growth rate per capita of 2.8 percent. One reason for this was an increase in labour productivity.

Productivity growth in Canada decreased after 1972, and the reasons for this slowdown are not fully understood. Some economists believe that the structural change from the production of goods to the production of services after the mid '70s has led to measurement errors. Others suggest that increases in environmental protection and workplace safety cause biased estimations. Still others suggest the rapid increase in oil prices after 1972. These issues are discussed more fully in Chapter 7.

1.5 The Language of Economics (pages 14–15)

Learning Objective: Define important economic terms.

This section provides a brief definition and preview of terms students will see throughout the book: entrepreneur, innovation, technology, firm (company or business), goods, services, revenue, profit, household, factors of production or economic resources, capital, and human capital.

Extra Economics in Your Life and Career:

Is Cheating an Optimal Decision?

In their best-selling book *Freakonomics*, Steven D. Levitt and Stephen J. Dubner stated: "Who cheats? Well, just about anyone, if the stakes are right . . . . Cheating . . . is a prominent feature in just about every human endeavor." Evidence that *some* people cheat surfaced in the summer of 2011 when the superintendent of the board of the Atlanta school district resigned after a report documented widespread cheating on standardized tests that implicated officials from about 80 percent of Atlanta's elementary and middle schools. In 2015, an Atlanta jury convicted 11 teachers as a result of the cheating scandal.

Steven Levitt and other economists assume that decision makers—students and nonstudents alike—are rational. They compare the benefits and costs of their options and make choices for which the expected benefits exceed the expected costs. The benefits of (successful) cheating may be monetary; for example, K-12 teachers in some states are eligible for bonus payments of up to $25,000 if their students perform well on standardized tests. New technology has made it easier for high school and college students to cheat. The widespread use of cell phones and Internet access makes it easier (less costly) to share exam answers and buy term papers.

Sources: Steven D. Levitt and Stephen J. Dubner, *Freakonomics* New York: HarperCollins 2005, pages 24–25; Patrik Jonsson, "America's biggest teacher and principal cheating scandal unfolds in Atlanta," *Christian Science Monitor*, July 5, 2011; Mary Beth McCauley, "Atlanta school cheating: When teachers cheat, what do you tell the kids?" *Christian Science Monitor*, September 5, 2013; and Valerie Strauss, "How and Why Convicted Teachers Cheated on Standardized Tests," *Washington Post*, April 1, 2015.

Question: For the sake of argument, let's assume that you would never cheat. Under what circumstances are students in general more or less likely to cheat on an economics examination?

Answer: Your economics instructor will be pleased if you would never cheat under any circumstances. But cheating is more likely when: (a) the positive consequences of receiving a high grade are significant (for example, a high grade is necessary to maintain a scholarship, gain admittance to medical school, or get a good job offer) and/or (b) the probability of getting caught is low (the instructor gives the same multiple-choice exam to all students in a large classroom with no supervision). Reducing the benefit and increasing the cost of getting caught will reduce the incidence of cheating. If appeals to personal integrity are not enough to convince students not to cheat, a more effective deterrent may be for potential employers to let students know that they fire dishonest employees.

Appendix

Using Graphs and Formulas (pages 21–32)

Learning Objective: Review the use of graphs and formulas.

Graphs simplify economic ideas and help make ideas more concrete. Economists and policymakers can use graphs to help solve real-world problems.

Graphs of One Variable

Figure 1A.1 displays examples of two common types of graphs: bar graphs and pie charts. The height of the bars in the bar graph represents the market shares of automobile firms. The pie chart shows the same information with market shares represented by the size of the pie's slices. Information on economic variables can also be displayed in time-series graphs. These graphs are displayed on a coordinate grid. The vertical axis (*y*-axis) of a coordinate grid measures the value of one variable. The point where the vertical axis intersects the horizontal axis is the origin. The horizontal axis of a coordinate grid measures the value of another variable. The points in a coordinate grid represent the values of the two variables. Figure 1A.2 illustrates examples of time-series graphs.

Graphs of Two Variables

Both microeconomics and macroeconomics use two-variable graphs extensively. Figure 1A.3 illustrates the graph of a linear or straight-line demand curve where price is measured along the vertical axis and quantity is measured along the horizontal axis.

A. Slopes of Lines

The slope of a straight line indicates how much the variable measured along the *y*-axis changes as the variable measured along the *x*-axis changes. Slope can be measured between any two points on the line because the slope of a straight line has a constant value. The slope can be expressed as the change in the value measured on the vertical axis divided by the change in the value measured on the horizontal axis; slope can also be expressed using the Greek letter delta (Δ) to stand for the change in a variable (slope = $\Delta y / \Delta x$). The slope is also referred to as the rise over the run.

$$\text{Slope} = \frac{\text{Change in value on the vertical axis}}{\text{Change in the value on the horizontal axis}} = \frac{\Delta y}{\Delta x} = \frac{\text{Rise}}{\text{Run}}$$

B. Taking into Account More Than Two Variables on a Graph

The demand curve in Figure 1A.4 shows the relationship between the price of pizza and the quantity of pizza sold, but the quantity of any good sold depends on more than just the price of the good. Allowing other variables to change will cause the position of the demand curve in the graph to change. The table in Figure 1A.5 shows the effect of a change in the price of hamburgers on the quantity of pizza demanded. By shifting the demand curve we take into account the effect of changes in a third variable.

C. Positive and Negative Relationships

Sometimes the relationship between two variables is negative, as in the case with the price of pizza and the quantity of pizza demanded. The relationship between two variables can be positive, as in Figure 1A.6 which shows values for income and consumption spending in Canada for the years 2008 to 2011.

D. Determining Cause and Effect

Inferring cause-and-effect relationships by observing graphs can lead to incorrect conclusions. One reason for this is that there may be an omitted variable that is not accounted for in the graph. A related problem in

determining cause and effect is reverse causality; this occurs when we conclude that changes in variable *X* cause changes in variable *Y*, when changes in variable *Y* cause changes in variable *X*.

E. Are Graphs of Economic Relationships Always Straight Lines?

The relationship between two variables is linear when it can be represented by a straight line. Few economic relationships are actually linear. However, it is often useful to approximate a nonlinear relationship with a linear relationship.

F. Slopes of Nonlinear Curves

To measure the slope of a nonlinear curve at a particular point, we must measure the slope of a tangent to the curve at that point. A tangent line touches the curve at only one point. The slope of a tangent is measured in the same way as the slope of any straight line.

Formulas

This section reviews several useful formulas and shows how to use them.

A. Formula for a Percentage Change

The formula for a percentage change between two variables for any two periods is

$$\text{Percentage change} = \frac{\text{Value in the second period} - \text{Value in the first period}}{\text{Value in the first period}} \times 100.$$

B. Formulas for the Areas of a Rectangle and a Triangle

The formula for the area of a rectangle is Base × Height. The formula for the area of a triangle is ½ (Base × Height).

C. Summary of Using Formulas

Follow these steps when using a formula:

1. Make sure you understand the economic concept the formula represents.
2. Make sure you are using the correct formula for the problem you are solving.
3. Make sure the number you calculate using the formula is economically reasonable.

Teaching Tips

You can assign the appendix as "on-your-own" reading. But don't assume students will understand the formula for computing a slope or a percentage change. Reviewing these formulas in class will be time well spent, either at this point in the course or when these formulas are first applied. Unlike bar charts and pie charts, students will need to use graphs of two variables and percentage changes often throughout the remainder of the text.

