Economics for Today

7e

Irvin B. Tucker
IRVIN B. TUCKER

Irvin B. Tucker has over thirty years of experience teaching introductory economics at the University of North Carolina Charlotte. He earned his B.S. in economics at N.C. State University and his M.A. and Ph.D. in economics from the University of South Carolina. Dr. Tucker is former director of the Center for Economic Education at the University of North Carolina Charlotte and a longtime member of the National Council on Economic Education. He is recognized for his ability to relate basic principles to economic issues and public policy. His work has received national recognition by being awarded the Meritorious Levy Award for Excellence in Private Enterprise Education, the Federation of Independent Business Award for Postsecondary Educator of the Year in Entrepreneurship and Economic Education, and the Freedom Foundation’s George Washington Medal for Excellence in Economic Education. In addition, his research has been published in numerous professional journal articles on a wide range of topics including industrial organization, entrepreneurship, and economics of education. Dr. Tucker is also the author of the highly successful Survey of Economics, seventh edition, a text for the one-semester principles of economics courses, published by Cengage South-Western Publishing.
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<td>Monetary Policy</td>
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<td>27</td>
<td>The Phillips Curve and Expectations Theory</td>
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<td>International Trade and Finance</td>
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<td>Economies in Transition</td>
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<td>Growth and the Less-Developed Countries</td>
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Note: Chapter numbers refer to the complete book, *Economics for Today*
TEXT WITH A MISSION

The purpose of Economics for Today, Seventh Edition, is to teach, in an engaging style, the basic operations of the U.S. economy to students who will take a two-term economics course. Rather than taking an encyclopedic approach to economic concepts, Economics for Today focuses on the most important tool in economics—supply and demand analysis—and applies it to clearly explain real-world economic issues.

Every effort has been made to make Economics for Today the most “student friendly” text on the market. This text was written because so many others expose students to a confusing array of economic analyses that force students to simply memorize in order to pass the course. Instead, Economics for Today presents a straightforward and unbiased approach that effectively teaches the application of basic economic principles. After reading this text, the student should be able to say “now that economics stuff in the news makes sense.”

HOW IT FITS TOGETHER

The text presents the core principles of microeconomics, macroeconomics, and international economics. The first 14 chapters introduce the logic of economic analysis and develop the core of microeconomic analysis. Here students learn the role of demand and supply in determining prices in competitive versus monopolistic markets. This part of the book explores such issues as minimum wage laws, rent control, and pollution. The next 13 chapters develop the macroeconomics part of the text. Using the modern, yet simple, aggregate demand and aggregate supply model, the text explains measurement of and changes in the price level, national output, and employment in the economy. The study of macroeconomics also includes how the supply of money and the demand for money influence the economy. Finally, the text concludes with three chapters devoted entirely to global issues. For example, students will learn how the supply of and demand for currencies determine exchange rates and what the complications of a strong or a weak dollar are.

TEXT FLEXIBILITY

The full version of Economics for Today is easily adapted to an instructor’s preference for the sequencing of microeconomics and macroeconomics topics. The text can be used in a macroeconomic–microeconomic sequence by teaching the first four chapters and then Parts 5 through 7. Next, microeconomics is covered in Parts 2 through 4. Finally, the course can be completed with Part 8, consisting of three chapters devoted to international economics.
An important design of this text is that it accommodates the two camps for teaching principles of macroeconomics: (1) those who cover both the Keynesian Cross and AD/AS models and (2) those who skip the Keynesian model and cover only the AD/AS model. For instructors who prefer the former model sequence, *Economics for Today* moves smoothly in Chapters 18–19 (8–9) from the Keynesian model (based on the Great Depression) to the AD/AS model in Chapter 20 (10). For instructors using the latter approach, this text is written so that instructors can skip the Keynesian model in Chapters 18–19 (8–9) and proceed from Chapter 17 (7) to Chapter 20 (10) without losing anything. For example, the spending multiplier is completely covered both in the Keynesian and AD/AS model chapters.

For instructors who wish to teach the self-correcting AD/AS model, emphasis can be placed on the appendixes to Chapters 20 (10) and 26 (16). Instructors who choose not to cover this model can simply skip these appendixes. In short, *Economics for Today* provides more comprehensive and flexible coverage of macroeconomics models than is available in other texts. Also, a customized text might meet your needs. If so, contact your South-Western/Cengage Learning sales representative for information.

**HOW NOT TO STUDY ECONOMICS**

To some students, studying economics is a little frightening because many chapters are full of graphs. Students often make the mistake of preparing for tests by trying to memorize the lines of graphs. When their graded tests are returned, the students using this strategy will probably exclaim, “What happened?” The answer to this query is that the students should have learned the economic concepts first; then they would understand the graphs as illustrations of these underlying concepts. Stated simply, superficial cramming for economics quizzes does not work.

For students who are anxious about using graphs, the appendix to Chapter 1 provides a brief review of graphical analysis. In addition, the *Graphing Workshop* and *Study Guide* contain step-by-step features on how to interpret graphs.

**CHANGES TO THE SEVENTH EDITION**

The basic layout of the seventh edition remains the same. The following are changes:

- Chapter 1 recognizes that students taking introductory college-level economics courses are considering their major. One reason to select economics is that the average starting salary for an undergraduate economics major is higher compared to many other majors. To aid their decision, current average starting salary figures for selected majors have been provided.
- Chapter 9 on Monopoly presents a new concept, network good, which updates this chapter by linking economies of scale and monopoly power to the popular Facebook and Match.com Web sites.
- Chapter 12 on Income Distribution, Poverty, and Discrimination has been updated with the latest figures on family income distribution and poverty rates. In addition, the feature articles on Social Security and fair pay for females have been updated. These are all timely features that generate great interest for students.
Chapter 14 on Environmental Economics is among today’s highly controversial issues. This issue is addressed by new Global Economics features titled “How Should Carbon Emissions Be Reduced: Cap and Trade or Carbon Taxes?” and “Why Is the Climate Change Problem So Hard to Solve?” The Analyze the Issue sections that accompany these features give students an opportunity to participate in this important environmental debate.

Chapter 17 on Inflation updates data on inflation and the You’re the Economist feature on “How Much More Does It Cost to Laugh?” In addition, a new Checkpoint titled “What Is the Real Price of Gasoline?” is added that provides an application for adjusting the price of gasoline for inflation over time. And here students enjoy learning how to convert Babe Ruth’s 1932 salary into today’s dollars.

Chapter 20(10) on Aggregate Demand and Supply has been revised to provide a unique, complete, unbiased, and realistic comparison of the Keynesian and self-correction macroeconomic models in contrast to texts that present only or primarily the self-correction model. To enhance student understanding and interest, updated actual CPI and real GDP numbers are used throughout rather than generic \( P \) and \( Q \). For example, a new exhibit is added that explains with actual data how decreases in aggregate demand during the current recession caused a movement along the flat Keynesian range of the aggregate supply curve with the CPI constant. Here students can clearly visualize and comprehend the Keynesian argument against the classical school that prices and wages are inflexible downward.

The appendix to Chapter 20(10) fully develops and explains the opposing self-correction model based on downward flexibility of prices and wages and a downward shifting short-run aggregate supply curve. Only by providing a complete presentation of both the Keynesian and self-correction models can the student understand the current macroeconomic public policy debate.

Chapter 21(11) on Fiscal Policy also uses realism as its hallmark by explaining the stimulus package and the spending multiplier process with real-world updated numbers.

Chapter 22(12) on The Public Sector highlights the important current issue of the changing economic character of the United States with global comparisons to other countries. Here, for example, updated data traces the growth of U.S. government expenditures and taxes since the Great Depression. And U.S. spending and taxation are compared to other countries. An explanation of the Value Added Tax (VAT) has been added to the You’re the Economist feature discussion of the flat tax and national sales tax.

Chapter 23(13) on Federal Deficits, Surpluses, and the National Debt focuses on the current “hot button” issue of federal deficits and the national debt using updated data and exhibits. This chapter now includes a discussion of the “PayGo” rule and a new exhibit giving a global comparison of the national debt as a percentage of GDP. The current financial crisis in Greece is included in the chapter debate over the consequences of the U.S. national debt.

Chapter 26(16) on Monetary Policy has been updated using actual data in the model that link changes in the money supply and changes in the aggregate demand curve required to restore the economy to full employment. Students’ interest is
enhanced by adding a set of exhibits comparing monetary policy during the Great Depression to monetary policy during the current Great Recession.

- The final three chapters of the text are the international chapters, and each has been updated. For example, the chapter on International Trade and Finance explains the recent sharp decline in the U.S. balance of trade. The chapter on Economies in Transition contrasts privatization in Cuba, Russia, and China to recent nationalization in the United States. And the chapter on Growth and the Less-Developed Countries presents updated data used to explain, for example, the link between economic freedom and quality-of-life indicators.

- New lecture PowerPoint® slides have been developed by the author and tested in his classroom.

**ALTERNATE VERSIONS OF THE BOOK**

For instructors who wish to spend various amounts of time for their courses and offer different topics of this text:

- *Economics for Today.* This complete version of the book contains all 30 chapters. It is designed for two-semester introductory courses that cover both microeconomics and macroeconomics.

- *Microeconomics for Today.* This version contains 17 chapters and is designed for one-semester courses in introductory microeconomics.

- *Macroeconomics for Today.* This version contains 20 chapters and is designed for one-semester courses in introductory macroeconomics.

- *Survey of Economics.* This version of the book contains 23 chapters. It is designed for one-semester courses that cover the basics of both microeconomics and macroeconomics.

The accompanying table shows precisely which chapters are included in each book.

Instructors who wish more information about these alternative versions should contact their local South-Western/Cengage Learning representative.

**MOTIVATIONAL PEDAGOGICAL FEATURES**

*Economics for Today* strives to motivate and advance the boundaries of pedagogy with the following features:

**Part Openers**

Each part begins with a statement of the overall mission of the chapters in the part. In addition, there is a nutshell introduction of each chapter in relation to the part’s learning objective.
Chapter Previews
Each chapter begins with a preview designed to pique the student’s interest and reinforce how the chapter fits into the overall scheme of the book. Each preview appeals to the student’s “Sherlock Holmes” impulses by posing several economics puzzles that can be solved by understanding the material presented in the chapter.

Margin Definitions and Flashcards
Key concepts introduced in the chapter are highlighted in bold type and then defined with the definitions again in the margins. This feature therefore serves as a quick reference. Key terms are also defined on the Tucker Web site with a Flashcard feature that is great for learning terms.

You’re the Economist
Each chapter includes boxed inserts that provide the acid test of “relevance to everyday life.” This feature gives the student an opportunity to encounter timely, real-world extensions of economic theory. For example, students read about Fred Smith as he writes an economics term paper explaining his plan to create FedEx. To ensure that the student wastes no time figuring out which concepts apply to the article, applicable concepts are listed after each title. Many of these boxed features include quotes from newspaper articles over a period of years demonstrating that economic concepts remain relevant over time.

Conclusion Statements
Throughout the chapters, highlighted conclusion statements of key concepts appear at the ends of sections and tie together the material just presented. Students will be able to see quickly if they have understood the main points of the section. A summary of these conclusion statements is provided at the end of each chapter.

Global Economics
Today’s economic environment is global. *Economics for Today* carefully integrates international topics throughout the text and presents the material using a highly readable and accessible approach designed for students with no training in international economics. All sections of the text that present global economics are identified by a special global icon in the text margin and in the Global Economics boxes. In addition, the final three chapters of the book are devoted entirely to international economics.
Analyze the Issue

This feature follows each You’re the Economist and Global Economics feature and asks specific questions that require students to test their knowledge of how the material in the boxed insert is relevant to the applicable concept. To allow these questions to be used in classroom discussions or homework assignments, answers are provided in the Instructor’s Manual rather than the text.

Checkpoint

Watch for these! Who said learning economics can’t be fun? This feature is a unique approach to generating interest and critical thinking. These questions spark students to check their progress by asking challenging economics puzzles in game-like style. Students enjoy thinking through and answering the questions, and then checking the answers at the end of the chapter. Students who answer correctly earn the satisfaction of knowing they have mastered the concepts.

Illustrations

Attractive large graphical presentations with grid lines and real-world numbers are essential for any successful economics textbook. Each exhibit has been carefully analyzed to ensure that the key concepts being represented stand out clearly. Brief descriptions are included with graphs to provide guidance for students as they study the graph. When actual data are used, the Web site reference is provided so that students can easily locate the data source.

Causation Chains Game

This will be one of your favorites. The highly successful causation chains are included under many graphs throughout the text. This pedagogical device helps students visualize complex economic relationships in terms of simple box diagrams that illustrate how one change causes another change. Each exhibit having a causation chain in the text is included in the Animated Causation Chains game on the Tucker Web site (www.cengage.com/economics/tucker). This game makes it fun to learn. Arrange the blocks correctly and hear the cheers.

Key Concepts

Key concepts introduced in the chapter are listed at the end of each chapter and on the Tucker Web site (www.cengage.com/economics/tucker). As a study aid, you can use the key concepts as flashcards to test your knowledge. First state the definition and then click on the term to check for correctness.
Visual Summaries
Each chapter ends with a brief point-by-point summary of the key concepts. Many of these summarized points include miniaturized versions of the important graphs and causation chains that illustrate many of the key concepts. These are intended to serve as visual reminders for students as they finish the chapters and are also useful in reviewing and studying for quizzes and exams.

Study Questions and Problems
The end-of-chapter questions and problems offer a variety of levels ranging from straightforward recall to deeply thought-provoking applications. The answers to odd questions and problems are in the back of the text. This feature gives students immediate feedback without requiring the instructor to check their work.

End-of-Chapter Practice Quizzes
A great help before quizzes. Many instructors test students using multiple-choice questions. For this reason, the final section of each chapter provides the type of multiple-choice questions given in the instructor’s Test Bank. The answers to all of these questions are given in the back of the text. In addition, students may visit the Tucker Web site (www.cengage.com/economics/tucker) and answer these questions online where an explanation of each correct answer is given.

Part Road Map
This feature concludes each part with review questions listed by chapter from the previous part. To reinforce the concepts, each set of questions relates to the interactive causation chain game. Click on the Tucker Web site (www.cengage.com/economics/tucker) and make learning fun listening to the cheers when correct and jeers for a wrong answer. Answers to the questions are in the back of the text.

Interactive Quizzes
In addition to the end-of-chapter practice quizzes, there are additional multiple-choice questions written by the author on the Tucker Web site (www.cengage.com/economics/tucker). Each quiz contains multiple questions like those found on a typical exam. Feedback is included for each answer so that you may know instantly why you have answered correctly or incorrectly. In addition, you may email yourself and/or your instructor the quiz results with a listing of correct and incorrect answers. Between this feature and the end-of-chapter practice quizzes, students are well prepared for tests.
Online Exercises
These exercises for each chapter are designed to spark students’ excitement about researching on the Internet by asking them to access online economic data and then answer questions related to the content of the chapter. All Internet exercises are on the Tucker Web site (www.cengage.com/economics/tucker) with direct links to the addresses so that students will not have the tedious and error-prone task of entering long Web site addresses.

Learning Objectives
Learning objectives link sections in the text and steps to achieve learning objectives. The steps include reference to “Ask the Instructor Video Clips” and the “Graphing Workshop” available through the CourseMate Web site.

A SUPPLEMENTS PACKAGE DESIGNED FOR SUCCESS
To learn more about the supplements for Economics for Today, visit the Tucker Web site, www.cengage.com/economics/tucker. For additional information, contact your South-Western/Cengage sales representative.

INSTRUCTOR RESOURCES
Aplia
Aplia, www.aplia.com, has joined forces with South-Western, the leading publisher for principles of economics and finance, to create the Aplia Integrated Textbook Solution. More students are currently using an Aplia product for principles of economics than those who are using all other Web-based learning programs combined. Because the homework in Aplia is automatically graded, you can assign homework more frequently to ensure your students are putting forth full effort and getting the most out of your class.

Instructor’s Manual
This manual, prepared by Douglas Copeland of Johnson County Community College, provides valuable course assistance to instructors. It includes chapter outlines, instructional objectives, critical thinking/group discussion questions, hints for effective teaching, answers to the Analyze the Issue questions, answers to even-numbered questions

**Test Bank**

Too often, Test Banks are not written by the author and the questions do not really fit the text. Not so here. The Test Bank is prepared by the text author to match the text. The Test Bank includes over 7,000 multiple-choice, true-false, and short essay questions arranged by the order presented in the chapter and grouped with concept headings that make it easy to select questions. Most questions have been thoroughly tested in the classroom by the author and are classified by topic and degree of difficulty. Text page references help locate pages where material related to questions is explained.

- Macro Test Bank ISBN: 1111222495

**ExamView**

ExamView Computerized Testing Software contains all of the questions in the printed Test Bank. ExamView is an easy-to-use test creation software compatible with both Windows and Macintosh. Instructors can add or edit questions, instructions, and answers; select questions by previewing them on the screen; or select questions randomly or by number. Instructors can also create and administer quizzes online, whether over the Internet, a local area network (LAN), or a wide area network (WAN). ExamView is available on the Instructor’s Resource CD ISBN: 1111222525.

**PowerPoint® Lecture Slides**

This state-of-the-art slide presentation developed by the text author provides instructors with visual support in the classroom for each chapter. Lecture slides contain vivid automated highlights of important concepts and exhibits. Instructors can edit the PowerPoint® presentations or create their own exciting in-class presentations. These slides are available on the Instructor’s Resource CD (ISBN: 1111222525) as well as for downloading from the Tucker Web site at www.cengage.com/economics/tucker.

**PowerPoint® Exhibit Slides**

These slides contain the figures, charts, and tables from the text. Instructors can easily incorporate them into their own PowerPoint® presentations by downloading from the Tucker Web site at www.cengage.com/economics/tucker. They are also available on the Instructor’s Resource CD ISBN: 1111222525.
Instructor’s Resource CD-ROM
Get quick access to all instructor ancillaries from your desktop. This easy-to-use CD lets you review, edit, and copy exactly what you need in the format you want. This supplement contains the Instructor’s Manual, Test Bank, ExamView Testing software, and the PowerPoint® Lecture and Exhibit slides. IRCD ISBN: 1111222525.

JoinIn TurningPoint CD  JoinIn is a response system that allows you to transform your classroom and assess your students’ progress with instant in-class quizzes and polls. Our exclusive agreement to offer TurningPoint software lets you pose book-specific questions and display students’ answers seamlessly within the Microsoft PowerPoint® slides of your own lecture, in conjunction with the “clicker” hardware of your choice. Enhance how your students interact with you, your lecture, and each other. For college and university adopters only. Contact your local South-Western representative to learn more.

Complete Online Tomlinson Videos Course  The Tomlinson videos are online multimedia video lecture series that provide students with instructional assistance 24/7. Students can watch these segments over and over as they prepare for class, review topics, and study for exams. Lecture notes and quizzes for each segment are also available. Professors may require students to view the videos before class to leave the class time free for activities or further explanation. www.cengage.com/economics/tomlinson

Student Resources

Study Guide
The Study Guide is recommended for each student using the text. It is perhaps the best way to prepare for quizzes. The Study Guide was prepared by the text author to prepare students before they take tests in class. The Study Guide contains student-friendly features such as the chapter in a nutshell, key concepts review, learning objectives, fill-in-the-blank questions, step-by-step interpretation of the graph boxes, multiple-choice questions, true-false questions, and crossword puzzles.


The Tucker CourseMate Web site
Available for purchase, the CourseMate Web site: (www.cengagebrain.com) features a content-rich, robust set of multimedia learning tools. These Web features have been specifically developed with the student in mind:

- **ABC News Videos.** This supplement consists of high-interest clips from current news events as well as historic raw footage going back forty years. Perfect for
discussion starters or to enrich your lectures and spark interest in the material in the text, these brief videos provide students with a new lens through which to view the past and present, one that will greatly enhance their knowledge and understanding of significant events and open up new dimensions in learning. Clips are drawn from such programs as *World News Tonight, Good Morning America, This Week, Primetime Live, 20/20,* and *Nightline,* as well as numerous ABC News specials and material from the Associated Press Television News and British Movietone News collections. Your South-Western Publishing representative will be happy to provide a complete listing of the videos and policies addressed.

- **The Graphing Workshop.** The Graphing Workshop is a one-stop learning resource for help in mastering the language of graphs, one of the more difficult aspects of an economics course for many students. It enables students to explore important economic concepts through a unique learning system made up of tutorials, interactive drawing tools, and exercises that teach how to interpret, reproduce, and explain graphs.

- **Ask the Instructor Video Clips.** Via streaming video, difficult concepts are explained and illustrated. These video clips are extremely helpful review and clarification tools if a student has trouble understanding an in-class lecture or is a visual learner.

- **Economic Applications (EconApps).** EconNews Online, EconDebates, and EconData features help to deepen students’ understanding of the theoretical concepts through hands-on exploration and analysis of the latest economic news stories, policy debates, and data.

### FOR STUDENTS AND INSTRUCTORS

#### The Wall Street Journal

The *Wall Street Journal* is synonymous with the latest word on business, economics, and public policy. *Economics for Today* makes it easy for students to apply economic concepts to this authoritative publication, and for you to bring the most up-to-date, real-world events into your classroom. For a nominal additional cost, *Economics for Today* can be packaged with a card entitling students to a 15-week subscription to both the print and online versions of the *Wall Street Journal.* Instructors with at least seven students who activate their subscriptions will automatically receive their own free subscription. Contact your South-Western/Cengage Learning sales representative for package pricing and ordering information.

#### CENGAGE LEARNING’S GLOBAL ECONOMIC WATCH

*Lessons from real life right now*

theory into intense real-life challenges that affect every family and business sector—making it one of the most teachable moments in modern history.

Cengage Learning's Global Economic Watch helps instructors bring these pivotal current events into the classroom—through a powerful, continuously updated online suite of content, discussion forums, testing tools, and more.

The Watch, a first-of-its-kind resource, stimulates discussion and understanding of the global downturn with easy-to-integrate teaching solutions:

- A content-rich blog of breaking news, expert analysis, and commentary—updated multiple times daily—plus links to many other blogs
- A powerful real-time database of hundreds of relevant and vetted journal, newspaper, and periodical articles, videos, and podcasts—updated four times every day
- A thorough overview and timeline of events leading up to the global economic crisis
- Discussion and testing content, PowerPoint® slides on key topics, sample syllabi, and other teaching resources
- Instructor and student forums for sharing questions, ideas, and opinions
- History is happening now. Bring it into your classroom. For more information on how you can enrich your course with The Watch, please visit www.cengage.com/thewatch.

TextChoice: Economic Issues and Activities

TextChoice is the home of Cengage Learning’s online digital content. TextChoice provides the fastest, easiest way for you to create your own learning materials. South-Western’s Economic Issues and Activities content database includes a wide variety of high-interest, current event/policy applications as well as classroom activities that are designed specifically to enhance introductory economics courses. Choose just one reading, or many—even add your own material—to create an accompaniment to the textbook that is perfectly customized to your course. Contact your South-Western/Cengage Learning sales representative for more information.

Tucker Web Site

The Tucker Web site at www.cengage.com/economics/tucker provides access to: Animated Causation Chains, practice quizzes, interactive quizzing, and other downloadable teaching and learning resources.

Acknowledgments

A deep debt of gratitude is owed to the reviewers for their expert assistance. All comments and suggestions were carefully evaluated and served to improve the final product. To each of the reviewers of all seven editions, I give my sincerest thanks.
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<td>R. Jack Inch</td>
<td>Oakland Community College</td>
</tr>
<tr>
<td>Hans R. Isakson</td>
<td>University of Northern Iowa</td>
</tr>
</tbody>
</table>
Barbara H. John  
*University of Dayton*

Petur O. Jonsson  
*Fayetteville State University*

Paul Jorgensen  
*Lin-Benton Community College*

Louise Keely  
*University of Wisconsin*

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*Arkansas State University*

Harry T. Kolendrianos  
*Danville Community College*

William F. Kordsmeier  
*University of Central Arkansas*

Margaret Landman  
*Bridgewater State College*

David Latzko  
*Pennsylvania State University, York*

Ralph F. Lewis  
*Orange Coast College*

Stephen E. Lile  
*Western Kentucky University*

Dandan Liu  
*Bowling Green State University*

Melody Lo  
*University of Southern Mississippi*

Thomas Maloy  
*Muskegon Community College*

Dayle Mandelson  
*University of Wisconsin-Stout*

Robert A. Margo  
*Vanderbilt University*

Melanie Marks  
*Longwood College*

Michael Marlow  
*Cal Polytechnic State U-SLO*

Fred May  
*Trident Technical College*

James C. McBrearty  
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Diana L. McCoy  
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Patrick B. O’Neill  
*University of North Dakota*

Jan Palmer  
*Ohio University*

Michael L. Palmer  
*Maple Woods Community College*

Elliott Parker  
*University of Nevada in Reno*

Kathy Parkison  
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Donald W. Pearson  
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Maurice Pfannestiel  
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Michael J. Pisani  
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L. Wayne Plumly, Jr.  
*Valdosta State University*

Ray Polchow  
*Muskingum Area Technical College*

Renee Prim  
*Central Piedmont Community College*

Fernando Quijano  
*Dickinson State University*

R. Larry Reynolds  
*Boise State University*

Kathryn Roberts  
*Chipola Junior College*

Steve Robinson  
*University of North Carolina at Wilmington*
SPECIAL THANKS

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In order to study the microeconomy, the chapters in Part 2 build on the basic concepts learned in Part 1. Chapters 3 and 4 explain the market demand and supply model, which has a wide range of real-world applications. Chapter 5 takes a closer look at movements along the demand curve introduced in Chapter 3. Chapter 6 returns to the law of demand and explores in more detail exactly why consumers make their choices among goods and services. Part 2 concludes in Chapter 7 with an extension of the concept of supply that explains how various costs of production change as output varies.
A cornerstone of the U.S. economy is the use of markets to answer the basic economic questions discussed in the previous chapter. Consider baseball cards, DVDs, physical fitness, gasoline, soft drinks, alligators, and sneakers. In a market economy, each is bought and sold by individuals coming together as buyers and sellers in markets. This chapter is extremely important because it introduces basic supply and demand analysis. This technique will prove to be valuable because it is applicable to a multitude of real-world choices of buyers and sellers facing the problem of scarcity. For example, the Global Economics feature asks you to consider the highly controversial issue of international trade in human organs. Demand represents the choice-making behavior of consumers, while supply represents the choices of producers. The chapter begins by looking closely at demand and then supply. Finally, it combines these forces to see how prices and quantities are determined in the marketplace. Market demand and supply analysis is the basic tool of microeconomic analysis.
In this chapter, you will learn to solve these economics puzzles:

- What is the difference between a “change in quantity demanded” and a “change in demand”?
- Can Congress repeal the law of supply to control oil prices?
- Does the price system eliminate scarcity?

THE LAW OF DEMAND

Economics might be referred to as “graphs and laughs” because economists are so fond of using graphs to illustrate demand, supply, and many other economic concepts. Unfortunately, some students taking economics courses say they miss the laughs.

Exhibit 1 reveals an important “law” in economics called the law of demand. The law of demand states there is an inverse relationship between the price of a good and the quantity buyers are willing to purchase in a defined time period, ceteris paribus. The law of demand makes good sense. At a “sale,” consumers buy more when the price of merchandise is cut.

In Exhibit 1, the demand curve is formed by the line connecting the possible price and quantity purchased responses of an individual consumer. The demand curve therefore allows you to find the quantity demanded by a buyer at any possible selling price by moving along the curve. For example, Bob, a sophomore at Marketplace College, loves watching movies on DVDs. Bob’s demand curve shows that at a price of $15 per DVD his quantity demanded is 6 DVDs purchased annually (point B). At the lower price of $10, Bob’s quantity demanded increases to 10 DVDs per year (point C). Following this procedure, other price and quantity possibilities for Bob are read along the demand curve.

Note that until we know the actual price determined by both demand and supply, we do not know how many DVDs Bob will actually purchase annually. The demand curve is simply a summary of Bob’s buying intentions. Once we know the market price, a quick look at the demand curve tells us how many DVDs Bob will buy.

CONCLUSION Demand is a curve or schedule showing the various quantities of a product consumers are willing to purchase at possible prices during a specified period of time, ceteris paribus.

Market Demand

To make the transition from an individual demand curve to a market demand curve, we total, or sum, the individual demand schedules. Suppose the owner of Zap Mart, a small retail chain of stores serving a few states, tries to decide what to charge for DVDs
Exhibit 1  An Individual Buyer's Demand Curve for DVDs

Bob’s demand curve shows how many DVDs he is willing to purchase at different possible prices. As the price of DVDs declines, the quantity demanded increases, and Bob purchases more DVDs. The inverse relationship between price and quantity demanded conforms to the law of demand.

<table>
<thead>
<tr>
<th>Price per DVD (dollars)</th>
<th>Quantity of DVDs (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
</tr>
</tbody>
</table>

and hires a consumer research firm. For simplicity, we assume Fred and Mary are the only two buyers in Zap Mart’s market, and they are sent a questionnaire that asks how many DVDs each would be willing to purchase at several possible prices. Exhibit 2 reports their price–quantity demanded responses in tabular and graphical form.

The market demand curve, $D_{total}$, in Exhibit 2 is derived by summing horizontally the two individual demand curves, $D_1$ and $D_2$, for each possible price. At a price of $20, for example, we sum Fred’s 2 DVDs demanded per year and Mary’s 1 DVD demanded per year to find that the total quantity demanded at $20 is 3 DVDs per year. Repeating the same process for other prices generates the market demand curve, $D_{total}$. For example, at a price of $5, the total quantity demanded is 12 DVDs.
THE DISTINCTION BETWEEN CHANGES IN QUANTITY DEMANDED AND CHANGES IN DEMAND

Price is not the only variable that determines how much of a good or service consumers will buy. Recall from Exhibit A-6 of Appendix 1 that the price and quantity variables in our model are subject to the ceteris paribus assumption. If we relax this assumption and allow other variables held constant to change, a
variety of factors can influence the position of the demand curve. Because these factors are not the price of the good itself, these variables are called nonprice determinants, or simply, demand shifters. The major nonprice determinants include (1) the number of buyers; (2) tastes and preferences; (3) income; (4) expectations of future changes in prices, income, and availability of goods; and (5) prices of related goods.

Before discussing these nonprice determinants of demand, we must pause to explain an important and possibly confusing distinction in terminology. We have been referring to a change in quantity demanded, which results solely from a change in the price. A change in quantity demanded is a movement between points along a stationary demand curve, ceteris paribus. In Exhibit 3(a), at the price of $15, the quantity demanded is 20 million DVDs per year. This is shown as point A on the demand curve, D. At a lower price of, say, $10, the quantity demanded increases to 30 million DVDs per year, shown as point B. Verbally, we describe the impact of the price decrease as an increase in the quantity demanded of 10 million DVDs per year.

Comparing parts (a) and (b) of Exhibit 3 is helpful in distinguishing between a change in quantity demanded and a change in demand. In part (b), suppose the market demand curve for DVDs is initially at D₁ and there is a shift to the right (an increase in demand) from D₁ to D₂. This means that at all possible prices consumers wish to purchase a larger quantity than before the shift occurred. At $15 per DVD, for example, 30 million DVDs (point B) will be purchased each year, rather than 20 million DVDs (point A).

Now suppose a change in some nonprice factor causes demand curve D₁ to shift leftward (a decrease in demand). The interpretation in this case is that at all possible prices consumers will buy a smaller quantity than before the shift occurred.

Exhibit 4 summarizes the terminology for the effects of changes in price and nonprice determinants on the demand curve.
Nonprice Determinants of Demand

Distinguishing between a change in quantity demanded and a change in demand requires some patience and practice. The following discussion of specific changes in nonprice factors or demand shifters will clarify how each nonprice variable affects demand.

Number of Buyers

Look back at Exhibit 2, and imagine the impact of adding more individual demand curves to the individual demand curves of Fred and Mary. At all possible prices, there is extra quantity demanded by the new customers, and the market demand curve for DVDs shifts rightward (an increase in demand). Population growth...
therefore tends to increase the number of buyers, which shifts the market demand curve for a good or service rightward. Conversely, a population decline shifts most market demand curves leftward (a decrease in demand).

The number of buyers can be specified to include both foreign and domestic buyers. Suppose the market demand curve $D_1$ in Exhibit 3(b) is for DVDs purchased in the United States by customers at home and abroad. Also assume Japan restricts the import of DVDs into Japan. What would be the effect of Japan removing this trade restriction? The answer is that the demand curve shifts rightward from $D_1$ to
$D_2$ when Japanese consumers add their individual demand curves to the U.S. market demand for DVDs.

**Tastes and Preferences**

A favorable or unfavorable change in consumer tastes or preferences means more or less of a product is demanded at each possible price. Fads, fashions, advertising, and new products can influence consumer preferences to buy a particular good or service. Beanie Babies, for example, became the rage in the 1990s, and the demand curve for these products shifted to the right. When people tire of a product, the demand curve will shift leftward. The physical fitness trend has increased the demand for health clubs and exercise equipment. On the other hand, have you noticed many stores selling hula hoops? Advertising can also influence consumers’ taste for a product. As a result, consumers are more likely to buy more at every price, and the demand curve for the product will shift to the right. Concern for global climate change has increased the demand for hybrid cars and recycling.

**Income**

Most students are all too familiar with how changes in income affect demand. There are two possible categories for the relationship between changes in income and changes in demand: (1) **normal goods** and (2) **inferior goods**.

A normal good is any good for which there is a direct relationship between changes in income and its demand curve. For many goods and services, an increase in income causes buyers to purchase more at any possible price. As buyers receive higher incomes, the demand curve shifts rightward for such normal goods as cars, steaks, vintage wine, cleaning services, and DVDs. A decline in income has the opposite effect, and the demand curve shifts leftward.

An inferior good is any good for which there is an inverse relationship between changes in income and its demand curve. A rise in income can result in reduced purchases of a good or service at any possible price. This might happen with such inferior goods as generic brands, Spam, discount clothing, and used cars. Instead of buying these inferior goods, higher incomes allow consumers to buy brand-name products, steaks, designer clothes, or new cars. Conversely, a fall in income causes the demand curve for inferior goods to shift rightward.

**Expectations of Buyers**

What is the effect on demand in the present when consumers anticipate future changes in prices, incomes, or availability? What happens when a war breaks out in the Middle East? Expectations that there will be a shortage of gasoline induce consumers to say “fill-’er-up” at every opportunity, and demand increases. Suppose students learn that the prices of the textbooks for several courses they plan to take next semester will double soon. Their likely response is to buy now, which causes an increase in the demand curve for these textbooks. Another example is a change in the weather, which can indirectly cause expectations to shift demand for some products. Suppose a hailstorm destroys a substantial portion of the peach crop.
Consumers reason that the reduction in available supply will soon drive up prices, and they dash to stock up before it is too late. This change in expectations causes the demand curve for peaches to increase. Prior to Hurricane Katrina hitting New Orleans, sales of batteries and flashlights soared.

**Prices of Related Goods**

Possibly the most confusing nonprice factor is the influence of other prices on the demand for a particular good or service. The term *nonprice* seems to forbid any shift in demand resulting from a change in the price of *any* product. This confusion exists when one fails to distinguish between changes in quantity demanded and changes in demand. Remember that ceteris paribus holds all prices of other goods constant. Therefore, movement along a demand curve occurs solely in response to changes in the price of a product, that is, its “own” price. When we draw the demand curve for Coca-Cola, for example, we assume the prices of Pepsi-Cola and other colas remain unchanged. What happens if we relax the ceteris paribus assumption and the price of Pepsi rises? Many Pepsi buyers switch to Coca-Cola, and the demand curve for Coca-Cola shifts rightward (an increase in demand). Coca-Cola and Pepsi-Cola are one type of related goods called *substitute goods*. A substitute good competes with another good for consumer purchases. As a result, there is a direct relationship between a price change for one good and the demand for its “competitor” good. Other examples of substitutes include margarine and butter, domestic cars and foreign cars, email and the U.S. Postal Service, and Internet movie downloads and DVDs.

DVDs and DVD players illustrate a second type of related goods called *complementary goods*. A complementary good is jointly consumed with another good. As a result, there is an inverse relationship between a price change for one good and the demand for its “go together” good. Although buying a DVD and buying a DVD player can be separate decisions, these two purchases are related. The more DVD players consumers buy, the greater the demand for DVDs. What happens when the price of DVD players falls sharply? The market demand curve for DVDs shifts rightward (an increase in demand) because new owners of players add their individual demand curves to those of persons already owning players and buying DVDs. Conversely, a sharp rise in the price of Hewlett-Packard (HP) Deskjet color printers would decrease the demand for color ink cartridges.

Exhibit 5 summarizes the relationship between changes in the nonprice determinants of demand and the demand curve, accompanied by examples for each type of nonprice factor change.

---

**CHECKPOINT**

*Can Gasoline Become an Exception to the Law of Demand?*

Suppose war in the Middle East threatened oil supplies and gasoline prices began rising. Consumers feared future oil shortages, and so they rushed to fill up their gas tanks. In this case, as the price of gas increased, consumers bought more, not less. Is this an exception to the law of demand?
### Exhibit 5
**Summary of the Impact of Changes in Nonprice Determinants of Demand on the Demand Curve**

<table>
<thead>
<tr>
<th>Nonprice Determinant of Demand</th>
<th>Relationship to Changes in Demand Curve</th>
<th>Shift in the Demand Curve</th>
<th>Examples</th>
</tr>
</thead>
</table>
| 1. Number of buyers             | Direct                                 |                           | • Immigration from Mexico increases the demand for Mexican food products in grocery stores.  
|                                 |                                        |                           | • A decline in the birthrate reduces the demand for baby clothes. |
| 2. Tastes and preferences       | Direct                                 |                           | • For no apparent reason, consumers want Beanie Babies and demand increases.  
|                                 |                                        |                           | • After a while, the fad dies and demand declines. |
| 3. Income                      |                                        |                           | • Consumers’ incomes increase, and the demand for steaks increases.  
| a. Normal goods                | Direct                                 |                           | • A decline in income decreases the demand for air travel. |
| b. Inferior goods              | Inverse                                |                           | • Consumers’ incomes increase, and the demand for hamburger decreases.  
|                                 |                                        |                           | • A decline in income increases the demand for bus service. |
| 4. Expectations of buyers      | Direct                                 |                           | • Consumers expect that gasoline will be in short supply next month and that prices will rise sharply. Consequently, consumers fill the tanks in their cars this month, and there is an increase in demand for gasoline. |

*Continued*
Continued from previous page

<table>
<thead>
<tr>
<th>Nonprice Determinant of Demand</th>
<th>Relationship to Changes in Demand Curve</th>
<th>Shift in the Demand Curve</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Prices of related Goods</td>
<td>a. Substitute goods</td>
<td>Direct</td>
<td>• Months later consumers expect the price of gasoline to fall soon, and the demand for gasoline decreases.</td>
</tr>
<tr>
<td>b. Complementary goods</td>
<td>Inverse</td>
<td></td>
<td>• A reduction in the price of tea decreases the demand for coffee.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• An increase in the price of airfares causes higher demand for train transportation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A decline in the price of cellular service increases the demand for cell phones.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A higher price for peanut butter decreases the demand for jelly.</td>
</tr>
</tbody>
</table>

**THE LAW OF SUPPLY**

In everyday conversations, the term *supply* refers to a specific quantity. A “limited supply” of golf clubs at a sporting goods store means there are only so many for sale and that’s all. This interpretation of supply is *not* the economist’s definition. To economists, supply is the relationship between ranges of possible prices and quantities supplied, which is stated as the law of supply. The law of supply states there is a direct relationship between the price of a good and the quantity sellers are willing to offer for sale in a defined time period, ceteris paribus. Interpreting the individual supply curve for Entertain City shown in Exhibit 6 is basically the same as interpreting Bob’s demand curve shown in Exhibit 1. Each point on the curve represents a quantity supplied (measured along the horizontal axis) at a particular price (measured along the vertical axis). For example, at a price of $10 per disc (point C), the quantity supplied by the seller, Entertain City, is 35,000 DVDs per year. At the higher price of $15, the quantity supplied increases to 45,000 DVDs per year (point B).

**Conclusion** *Supply* is a curve or schedule showing the various quantities of a product sellers are willing to produce and offer for sale at possible prices during a specified period of time, ceteris paribus.
Exhibit 6  An Individual Seller’s Supply Curve for DVDs

The supply curve for an individual seller, such as Entertain City, shows the quantity of DVDs offered for sale at different possible prices. As the price of DVDs rises, a retail store has an incentive to increase the quantity of DVDs supplied per year. The direct relationship between price and quantity supplied conforms to the law of supply.

Exhibit 6  An Individual Seller’s Supply Schedule for DVDs

<table>
<thead>
<tr>
<th>Point</th>
<th>Price per DVD</th>
<th>Quantity supplied (thousands per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$20</td>
<td>50</td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

Why are sellers willing to sell more at a higher price? Suppose Farmer Brown is trying to decide whether to devote more of his land, labor, and barn space to the production of soybeans. Recall from Chapter 2 the production possibilities curve and the concept of increasing opportunity cost developed in Exhibit 3. If Farmer Brown devotes few of his resources to producing soybeans, the opportunity cost of, say, producing milk is small. But increasing soybean production means a higher opportunity cost, measured by the quantity of milk not produced. The logical question is: What would induce Farmer Brown to produce more soybeans for sale
and overcome the higher opportunity cost of producing less milk? You guessed it! There must be the incentive of a higher price for soybeans.

**CONCLUSION** Only at a higher price will it be profitable for sellers to incur the higher opportunity cost associated with producing and supplying a larger quantity.

**CHECKPOINT**

*Can the Law of Supply Be Repealed for the Oil Market?*

The United States experienced two oil shocks during the 1970s in the aftermath of Middle East tensions. Congress said no to high oil prices by passing a law prohibiting prices above a legal limit. Supporters of such price controls said this was a way to ensure adequate supply without allowing oil producers to earn excess profits. Did price controls increase, decrease, or have no effect on U.S. oil production during the 1970s?

**Market Supply**

To construct a *market* supply curve, we follow the same procedure used to derive a market demand curve. That is, we *horizontally* sum all the quantities supplied at various prices that might prevail in the market.

Let’s assume Entertain City and High Vibes Company are the only two firms selling DVDs in a given market. As you can see in Exhibit 7, the market supply curve, $S_{\text{total}}$, slopes upward to the right. At a price of $25, Entertain City will supply 25,000 DVDs per year, and High Vibes will supply 35,000 DVDs per year. Thus, summing the two individual supply curves, $S_1$ and $S_2$, *horizontally*, the total of 60,000 DVDs is plotted at this price on the market supply curve, $S_{\text{total}}$. Similar calculations at other prices along the price axis generate a market supply curve, telling us the total amount of DVDs these businesses offer for sale at different selling prices.

**THE DISTINCTION BETWEEN CHANGES IN QUANTITY SUPPLIED AND CHANGES IN SUPPLY**

As in demand theory, the price of a product is not the only factor that influences how much sellers offer for sale. Once we relax the ceteris paribus assumption, there are six principal *nonprice determinants* (or simply, *supply shifters*) that can shift the supply curve’s position: (1) the number of sellers, (2) technology, (3) resource prices, (4) taxes and subsidies, (5) expectations, and (6) prices of other goods. We will discuss these nonprice determinants in more detail momentarily, but first we must distinguish between a change in quantity supplied and a change in supply.
A change in quantity supplied is a movement between points along a stationary supply curve, ceteris paribus. In Exhibit 8(a), at the price of $10, the quantity supplied is 30 million DVDs per year (point $A$). At the higher price of $15, sellers offer a larger “quantity supplied” of 40 million DVDs per year (point $B$). Economists describe the effect of the rise in price as an increase in the quantity supplied of 10 million DVDs per year.

**CONCLUSION** Under the law of supply, any increase in price along the vertical axis will cause an increase in the quantity supplied, measured along the horizontal axis.
A change in supply is an increase (rightward shift) or a decrease (leftward shift) in the quantity supplied at each possible price. If ceteris paribus no longer applies and if one of the six nonprice factors changes, the impact is to alter the supply curve’s location.

**Conclusion** Changes in nonprice determinants can produce only a shift in the supply curve and not a movement along the supply curve.

In Exhibit 8(b), the rightward shift (an increase in supply) from $S_1$ to $S_2$ means that at all possible prices sellers offer a greater quantity for sale. At $15 per DVD, for instance, sellers provide 40 million for sale annually (point $B$), rather than 30 million (point $A$).

**Exhibit 8** Movement along a Supply Curve versus a Shift in Supply

Part (a) presents the market supply curve, $S$, for DVDs per year. If the price is $10 at point $A$, the quantity supplied by firms will be 30 million DVDs. If the price increases to $15 at point $B$, the quantity supplied will increase from 30 million to 40 million DVDs.

Part (b) illustrates an increase in supply. A change in some nonprice determinant can cause an increase in supply from $S_1$ to $S_2$. At a price of $15 on $S_1$ (point $A$), the quantity supplied per year is 30 million DVDs. At this price on $S_2$ (point $B$), the quantity supplied increases to 40 million.
Another case is that some nonprice factor changes and causes a leftward shift (a decrease in supply) from supply curve $S_1$. As a result, a smaller quantity will be offered for sale at any price.

Exhibit 9 summarizes the terminology for the effects of changes in price and nonprice determinants on the supply curve.

**Exhibit 9**

**Terminology for Changes in Price and Nonprice Determinants of Supply**

Caution! As with demand curves, you must distinguish between a change in quantity supplied, which is a movement along a supply curve ($S_1$) in response to a change in price, and a shift in the supply curve. An increase in supply (shift to $S_2$) or decrease in supply (shift to $S_3$) is caused by a change in some nonprice determinant and not by a change in the price.

<table>
<thead>
<tr>
<th>Change</th>
<th>Effect</th>
<th>Terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price increases</td>
<td>Upward movement along the supply curve</td>
<td>Increase in the quantity supplied</td>
</tr>
<tr>
<td>Price decreases</td>
<td>Downward movement along the supply curve</td>
<td>Decrease in the quantity supplied</td>
</tr>
<tr>
<td>Nonprice determinant</td>
<td>Leftward or rightward shift in the supply curve</td>
<td>Decrease or increase in supply</td>
</tr>
</tbody>
</table>
PART 2  MICROECONOMIC FUNDAMENTALS

NONPRICE DETERMINANTS OF SUPPLY

Now we turn to how each of the six basic nonprice factors affects supply.

Number of Sellers

What happens when a severe drought destroys wheat or a frost ruins the orange crop? The damaging effect of the weather may force orange growers out of business, and supply decreases. When the government eases restrictions on hunting alligators, the number of alligator hunters increases, and the supply curve for alligator meat and skins increases. Internationally, the United States may decide to lower trade barriers on textile imports, and this action increases supply by allowing new foreign firms to add their individual supply curves to the U.S. market supply curve for textiles. Conversely, higher U.S. trade barriers on textile imports shift the U.S. market supply curve for textiles leftward.

Technology

Never has society experienced such an explosion of new production techniques. Throughout the world, new and more efficient technology is making it possible to manufacture more products at any possible selling price. New, more powerful computers reduce production costs and increase the supply of all sorts of goods and services. For example, computers are now milking cows. Computers admit the cows into the milking area and then activate lasers to guide milking cups into place. Dairy farmers no longer must wake up at 5:30 a.m., and cows get milked whenever they fancy, day or night. As this technology spreads across the United States, it will be possible to offer more milk for sale at each possible price, and the entire supply curve for milk shifts to the right.

Resource Prices

Natural resources, labor, capital, and entrepreneurship are all required to produce products, and the prices of these resources affect supply. Suppose many firms are competing for computer programmers to design their software, and the salaries of these highly skilled workers increase. This increase in the price of labor adds to the cost of production. As a result, the supply of computer software decreases because sellers must charge more than before for any quantity supplied. Any reduction in production cost caused by a decline in the price of resources will have an opposite effect and increase supply.

Taxes and Subsidies

Certain taxes, such as sales taxes, have the same effect on supply as an increase in the price of a resource. The impact of an increase in the sales tax is similar to a rise in the salaries of computer programmers. The higher sales tax imposes an additional production cost on, for example, DVDs, and the supply curve shifts leftward. Conversely, a payment from the government for each DVD produced (an unlikely
Radio was in existence for 38 years before 50 million people tuned in. Television took 13 years to reach that benchmark. Sixteen years after the first PC kit came out, 50 million people were using one. Once opened to the public, the Internet crossed that line in four years.1

An Associated Press article reported in 1998:

Personal computers, which tumbled below the $1,000-price barrier just 18 months ago, now are breaking through the $400 price mark—putting them within reach of the average U.S. family. The plunge in PC prices reflects declining wholesale prices for computer parts, such as microprocessors, memory chips, and hard drives. “We’ve seen a massive transformation in the PC business,” said Andrew Peck, an analyst with Cowen & Co., based in Boston. Today’s computers costing below $1,000 are equal or greater in power than PCs costing $1,500 and more just a few years ago—working well for word processing, spreadsheet applications, and Internet access, the most popular computer uses.2

In 1999, a Wall Street Journal article reported that PC makers and distributors were bypassing their industry’s time-honored sales channels. PC makers such as Compaq and Hewlett-Packard are now using the Internet to sell directly to consumers. In doing so, they are following the successful strategy of Dell, which for years has bypassed storefront retailers and the PC distributors who traditionally keep them stocked, going instead straight to the consumer with catalogs, an 800 number, and Web sites.3

In 2001, a New York Times article described a computer price war:

We reached a situation where the market was saturated in 2000. People who needed computers had them. Vendors are living on sales of replacements, at least in the United States. But that doesn’t give you the kind of growth these companies were used to. In the past, most price cuts came from falling prices for processors and other components. In addition, manufacturers have been narrowing profit margins for the last couple years. But when demand dried up last fall, the more aggressive manufacturers decided to try to gain market share by cutting prices to the bone. This is an all-out battle for market share.4

In 2006, an analyst in USA Today observed that users could pick up good deals on desktop and notebook PCs following computer chip price cuts. Chipmakers Intel and AMD reduced the cost of computer chips in a price war. This article concluded that prices were falling at the right time and users will get good specification for their investment.5 And in 2009, Dell, Gateway, and Asus sold computers for less than $300 that outperformed most middle-of-the-road PCs from only a few years previously.

**ANALYZE THE ISSUE**

Identify changes in quantity demanded, changes in demand, changes in quantity supplied, and changes in supply described in the article. For any change in demand or supply, also identify the nonprice determinant causing the change.

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subsidy) would have the same effect as lower prices for resources or a technological advance. That is, the supply curve for DVDs shifts rightward.

**Expectations of Producers**

Expectations affect both current demand and current supply. Suppose a war in the Middle East causes oil producers to believe that oil prices will rise dramatically. Their initial response could be to hold back a portion of the oil in their storage tanks so they can sell more and make greater profits later when oil prices rise. One approach used by the major oil companies might be to limit the amount of gasoline delivered to independent distributors. This response by the oil industry shifts the current supply curve to the left. Now suppose farmers anticipate the price of wheat will soon fall sharply. The reaction is to sell their inventories stored in silos today before the price declines tomorrow. Such a response shifts the supply curve for wheat to the right.

**Prices of Other Goods the Firm Could Produce**

Businesses are always considering shifting resources from producing one good to producing another good. A rise in the price of one product relative to the prices of other products signals to suppliers that switching production to the product with the higher relative price yields higher profit. Suppose the price of corn rises because of government incentives to grow corn for ethanol, while the price of wheat remains the same; then many farmers will divert more of their land to corn and less to wheat. The result is an increase in the supply of corn and a decrease in the supply of wheat. This happens because the opportunity cost of growing corn, measured in forgone corn profits, increases.

Exhibit 10 summarizes the relationship between changes in the nonprice determinants of supply and the supply curve, accompanied by examples for each type of nonprice factor change.

### Exhibit 10

<table>
<thead>
<tr>
<th>Nonprice Determinant of Supply</th>
<th>Relationship to Changes in Supply Curve</th>
<th>Shift in the Supply Curve</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of sellers</td>
<td>Direct</td>
<td>Price $s_1 - s_2$</td>
<td>• The United States lowers trade restrictions on foreign textiles, and the supply of textiles in the United States increases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quantity $a$</td>
<td>• A severe drought destroys the orange crop, and the supply of oranges decreases.</td>
</tr>
</tbody>
</table>

Continued
## Nonprice Determinant of Supply

### Relationship to Changes in Supply Curve

### Shift in the Supply Curve

### Examples

2. **Technology**
   - **Direct**
   - New methods of producing automobiles reduce production costs, and the supply of automobiles increases.
   - Technology is destroyed in war, and production costs increase; the result is a decrease in the supply of good X.

3. **Resource prices**
   - **Direct**
   - A decline in the price of computer chips increases the supply of computers.
   - An increase in the cost of farm equipment decreases the supply of soybeans.

4. **Taxes and subsidies**
   - **Inverse and direct**
   - An increase in the per-pack tax on cigarettes reduces the supply of cigarettes.
   - Government payments to ethanol refineries based on the number of gallons produced increases the supply of ethanol.

5. **Expectations**
   - **Inverse**
   - Oil companies anticipate a substantial rise in future oil prices, and this expectation causes these companies to decrease their current supply of oil.
   - Farmers expect the future price of wheat to decline, so they increase the present supply of wheat.

6. **Prices of other goods and services**
   - **Inverse**
   - A rise in the price of brand-name drugs causes drug companies to decrease the supply of generic drugs.
   - A decline in the price of tomatoes causes farmers to increase the supply of cucumbers.
Global Economics The Market Approach to Organ Shortages Applicable Concept: price system

There is a global market in human organs in spite of attempts to prevent these transactions. For example, China banned organ sales in 2006, and India did the same in 1994.

The National Transplant Organ Act of 1984 made sale of organs illegal in the United States. Economist James R. Rinehart wrote the following on this subject:

If you were in charge of a kidney transplant program with more potential recipients than donors, how would you allocate the organs under your control? Life and death decisions cannot be avoided. Some individuals are not going to get kidneys regardless of how the organs are distributed because there simply are not enough to go around. Persons who run such programs are influenced in a variety of ways. It would be difficult not to favor friends, relatives, influential people, and those who are championed by the press. Dr. John la Puma, at the Center for Clinical Medical Ethics, University of Chicago, suggested that we use a lottery system for selecting transplant patients. He feels that the present rationing system is unfair.

The selection process frequently takes the form of having the patient wait at home until a suitable donor is found. What this means is that, at any given point in time, many potential recipients are just waiting for an organ to be made available. In essence, the organs are rationed to those who are able to survive the wait. In many situations, patients are simply screened out because they are not considered to be suitable candidates for a transplant. For instance, patients with heart disease and overt psychosis often are excluded. Others with end-stage liver disorders are denied new organs on the grounds that the habits that produced the disease may remain to jeopardize recovery. . . .

A Market Supply and Demand Analysis

A drumroll please! Buyer and seller actors are on center stage to perform a balancing act in a market. A market is any arrangement in which buyers and sellers interact to determine the price and quantity of goods and services exchanged. Let’s consider the retail market for sneakers. Exhibit 11 displays hypothetical market demand and supply data for this product. Notice in column 1 of the exhibit that price serves as a common variable for both supply and demand relationships. Columns 2 and 3 list the quantity demanded and the quantity supplied for pairs of sneakers per year.

The important question for market supply and demand analysis is: Which selling price and quantity will prevail in the market? Let’s start by asking what will happen if retail stores supply 75,000 pairs of sneakers and charge $105 a pair. At this relatively high price for sneakers, consumers are willing and able to purchase only 25,000 pairs. As a result, 50,000 pairs of sneakers remain as unsold inventory on the shelves of sellers (column 4), and the market condition is a surplus (column 5). A surplus is a market condition existing at any price where the quantity supplied is greater than the quantity demanded.

How will retailers react to a surplus? Competition forces sellers to bid down their selling price to attract more sales (column 6). If they cut the selling price to $90, there will still be a surplus of 40,000 pairs of sneakers, and pressure on sellers...
Under the present arrangements, owners receive no monetary compensation; therefore, suppliers are willing to supply fewer organs than potential recipients want. Compensating a supplier monetarily would encourage more people to offer their organs for sale. It also would be an excellent incentive for us to take better care of our organs. After all, who would want an enlarged liver or a weak heart?\textsuperscript{1}

The following excerpt from a newspaper article illustrates the controversy:

Mickey Mantle’s temporary deliverance from death, thanks to a liver transplant, illustrated how the organ-donations system is heavily weighted against poor potential recipients who cannot pass what University of Pennsylvania medical ethicist Arthur Caplan calls the “wallet biopsy.”\ldots Thus, affluent patients like Mickey Mantle may get evaluated and listed simultaneously in different regions to increase their odds of finding a donor. The New Yorker found his organ donor in Texas’ Region 4. Such a system is not only highly unfair, but it leads to other kinds of abuses.\textsuperscript{2}

Based on altruism, the organ donor distribution system continues to result in shortages. In 2009, the United Network for Organ Sharing (UNOS) reported that there were over 100,000 patients waiting on the list for organs. To address the shortage of organ donation, some European countries such as Spain, Belgium, and Austria have implemented an “opt-out” organ donation system. In the “opt-out” system, people are automatically considered to be organ donors unless they officially declare that they do not wish to be donors.

### Analyze the Issue

1. Draw supply and demand curves for the U.S. organ market and compare the U.S. market to the market in a country where selling organs is legal.
2. What are some arguments against using the price system to allocate organs?
3. Should foreigners have the right to buy U.S. organs and U.S. citizens have the right to buy foreign organs?

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to cut their selling price will continue. If the price falls to $75, there will still be an unwanted surplus of 20,000 pairs of sneakers remaining as inventory, and pressure to charge a lower price will persist.

### Exhibit 11

Demand, Supply, and Equilibrium for Sneakers (pairs per year)

<table>
<thead>
<tr>
<th>(1) Price per pair</th>
<th>(2) Quantity demanded</th>
<th>(3) Quantity supplied</th>
<th>(4) Difference (3) − (2)</th>
<th>(5) Market condition</th>
<th>(6) Pressure on price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$105</td>
<td>25,000</td>
<td>75,000</td>
<td>+50,000</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>90</td>
<td>30,000</td>
<td>70,000</td>
<td>+40,000</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>75</td>
<td>40,000</td>
<td>60,000</td>
<td>+20,000</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>60</td>
<td>50,000</td>
<td>50,000</td>
<td>0</td>
<td>Equilibrium</td>
<td>Stationary</td>
</tr>
<tr>
<td>45</td>
<td>60,000</td>
<td>35,000</td>
<td>−25,000</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>30</td>
<td>80,000</td>
<td>20,000</td>
<td>−60,000</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>15</td>
<td>100,000</td>
<td>5,000</td>
<td>−95,000</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
</tbody>
</table>
Now let’s assume sellers slash the price of sneakers to $15 per pair. This price is very attractive to consumers, and the quantity demanded is 100,000 pairs of sneakers each year. However, sellers are willing and able to provide only 5,000 pairs at this price. The good news is that some consumers buy these 5,000 pairs of sneakers at $15. The bad news is that potential buyers are willing to purchase 95,000 more pairs at that price but cannot, because the shoes are not on the shelves for sale. This out-of-stock condition signals the existence of a shortage. A shortage is a market condition existing at any price where the quantity supplied is less than the quantity demanded.

In the case of a shortage, unsatisfied consumers compete to obtain the product by bidding to pay a higher price. Because sellers are seeking the higher profits that higher prices make possible, they gladly respond by setting a higher price of, say, $30 and increasing the quantity supplied to 20,000 pairs annually. At the price of $30, the shortage persists because the quantity demanded still exceeds the quantity supplied. Thus, a price of $30 will also be temporary because the unfulfilled quantity demanded provides an incentive for sellers to raise their selling price further and offer more sneakers for sale. Suppose the price of sneakers rises to $45 a pair. At this price, the shortage falls to 25,000 pairs, and the market still gives sellers the message to move upward along their market supply curve and sell for a higher price.

### Equilibrium Price and Quantity

Assuming sellers are free to sell their products at any price, trial and error will make all possible price-quantity combinations unstable except at equilibrium. Equilibrium occurs at any price and quantity where the quantity demanded and the quantity supplied are equal. Economists also refer to equilibrium as market clearing.

In Exhibit 11, $60 is the equilibrium price, and 50,000 pairs of sneakers is the equilibrium quantity per year. Equilibrium means that the forces of supply and demand are “in balance” or “at risk” and there is no reason for price or quantity to change, ceteris paribus. In short, all prices and quantities except a unique equilibrium price and quantity are temporary. Once the price of sneakers is $60, this price will not change unless a nonprice factor changes demand or supply.

English economist Alfred Marshall (1842–1924) compared supply and demand to a pair of scissor blades. He wrote, “We might as reasonably dispute whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper, as whether value is governed by utility [demand] or cost of production [supply].” Joining market supply and market demand in Exhibit 12 allows us to clearly see the “two blades,” that is, the demand curve, $D$, and the supply curve, $S$. We can measure the amount of any surplus or shortage by the horizontal distance between the demand and supply curves. At any price above equilibrium—say, $90—there is an excess quantity supplied (surplus) of 40,000 pairs of sneakers. For any price below equilibrium—$30, for example—the horizontal distance between the curves tells us there is an excess quantity demanded (shortage) of 60,000 pairs. When the price per pair is $60, the market supply curve and the market demand curve intersect at point $E$, and the quantity demanded equals the quantity supplied at 50,000 pairs per year.

### Conclusion

Graphically, the intersection of the supply curve and the demand curve is the market equilibrium price-quantity point. When all other nonprice factors are held constant, this is the only stable coordinate on the graph.

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Exhibit 12  The Supply and Demand for Sneakers

The supply and demand curves represent a market for sneakers. The intersection of the demand curve, $D$, and the supply curve, $S$, at point $E$ indicates the equilibrium price of $60 and the equilibrium quantity of 50,000 pairs bought and sold per year. At any price above $60, a surplus prevails, and pressure exists to push the price downward. At $90, for example, the excess quantity supplied of 40,000 pairs remains unsold. At any price below $60, a shortage provides pressure to push the price upward. At $30, for example, the excess quantity demanded of 60,000 pairs encourages consumers to bid up the price.
RATIONING FUNCTION OF THE PRICE SYSTEM

Our analysis leads to an important conclusion. The predictable or stable outcome in the sneakers example is that the price will eventually come to rest at $60 per pair. All other factors held constant, the price may be above or below $60, but the forces of surplus or shortage guarantee that any price other than the equilibrium price is temporary. This is the theory of how the price system operates, and it is the cornerstone of microeconomic analysis. The price system is a mechanism that uses the forces of supply and demand to create an equilibrium through rising and falling prices. Stated simply, price plays a rationing role. The price system is important because it is a mechanism for distributing scarce goods and services. At the equilibrium price of $60, only those consumers willing to pay $60 per pair get sneakers, and there are no shoes for buyers unwilling to pay that price.

CHECKPOINT

Can the Price System Eliminate Scarcity?

You visit Cuba and observe that at “official” prices there is a constant shortage of consumer goods in government stores. People explain that in Cuba scarcity is caused by low prices combined with low production quotas set by the government. Many Cuban citizens say that the condition of scarcity would be eliminated if the government would allow markets to respond to supply and demand. Can the price system eliminate scarcity?
Key Concepts

Law of demand
Demand
Change in quantity demanded
Change in demand
Normal good
Inferior good
Substitute good
Complementary good
Law of supply
Supply
Change in quantity supplied
Change in supply
Market
Surplus
Shortage
Equilibrium
Price system

Summary

- The law of demand states there is an inverse relationship between the price and the quantity demanded, ceteris paribus. A market demand curve is the horizontal summation of individual demand curves.

- A change in quantity demanded is a movement along a stationary demand curve caused by a change in price. When any of the nonprice determinants of demand changes, the demand curve responds by shifting. An increase in demand (rightward shift) or a decrease in demand (leftward shift) is caused by a change in one of the nonprice determinants.

Change in Quantity Demanded

- Nonprice determinants of demand are as follows:
  a. Number of buyers
  b. Tastes and preferences
  c. Income (normal and inferior goods)
  d. Expectations of future price and income changes
  e. Prices of related goods (substitutes and complements)

- The law of supply states there is a direct relationship between the price and the quantity supplied, ceteris paribus. The market supply curve is the horizontal summation of individual supply curves.
• A change in quantity supplied is a movement along a stationary supply curve caused by a change in price. When any of the nonprice determinants of supply changes, the supply curve responds by shifting. An increase in supply (rightward shift) or a decrease in supply (leftward shift) is caused by a change in one of the nonprice determinants.

Change in Quantity Supplied

(a) Increase in quantity supplied

<table>
<thead>
<tr>
<th>Price per DVD (dollars)</th>
<th>Quantity of DVDs (millions per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

• Nonprice determinants of supply are as follows:
  a. Number of sellers
  b. Technology
  c. Resource prices
  d. Taxes and subsidies
  e. Expectations of future price changes
  f. Prices of other goods and services

• A surplus or shortage exists at any price where the quantity demanded and the quantity supplied are not equal. When the price of a good is higher than the equilibrium price, there is an excess quantity supplied, or a surplus. When the price is less than the equilibrium price, there is an excess quantity demanded, or a shortage.

• Equilibrium is the unique price and quantity established at the intersection of the supply and demand curves. Only at equilibrium does quantity demanded equal quantity supplied.

Equilibrium

• The price system is the supply and demand mechanism that establishes equilibrium through the ability of prices to rise and fall.
Summary of Conclusion Statements

- Demand is a curve or schedule showing the various quantities of a product consumers are willing to purchase at possible prices during a specified period of time, ceteris paribus.
- Under the law of demand, any decrease in price along the vertical axis will cause an increase in quantity demanded, measured along the horizontal axis.
- Changes in nonprice determinants can produce only a shift in the demand curve and not a movement along the demand curve, which is caused by a change in price.
- Supply is a curve or schedule showing the various quantities of a product sellers are willing to produce and offer for sale at possible prices during a specified period of time, ceteris paribus.
- Only at a higher price will it be profitable for sellers to incur the higher opportunity cost associated with producing and supplying a larger quantity.
- Under the law of supply, any increase in price along the vertical axis will cause an increase in quantity supplied, measured along the horizontal axis.
- Changes in nonprice determinants can only produce a shift in the supply curve and not a movement along the supply curve.
- Graphically, the intersection of the supply curve and the demand curve is the market equilibrium price-quantity point. When all other nonprice factors are held constant, this is the only stable coordinate on the graph.

Study Questions and Problems

1. Some people will pay a higher price for brand-name goods. For example, some people buy Rolls Royces and Rolex watches to impress others. Does knowingly paying higher prices for certain items just to be a “snob” violate the law of demand?
2. Draw graphs to illustrate the difference between a decrease in the quantity demanded and a decrease in demand for Mickey Mantle baseball cards. Give a possible reason for change in each graph.
3. Suppose oil prices rise sharply for years as a result of a war in the Persian Gulf region. What happens and why to the demand for a. cars. b. home insulation. c. coal. d. tires.
4. Draw graphs to illustrate the difference between a decrease in quantity supplied and a decrease in supply for condominiums. Give a possible reason for change in each graph.
5. Use supply and demand analysis to explain why the quantity of word processing software exchanged increases from one year to the next.
6. Predict the direction of change for either supply or demand in the following situations:
   a. Several new companies enter the cell phone industry.
   b. Consumers suddenly decide SUVs are unfashionable.
   c. The U.S. Surgeon General issues a report stating that tomatoes prevent colds.
   d. Frost threatens to damage the coffee crop, and consumers expect the price to rise sharply in the future.
   e. The price of tea falls. What is the effect on the coffee market?
   f. The price of sugar rises. What is the effect on the coffee market?
   g. Tobacco lobbyists convince Congress to remove the tax paid by sellers on each carton of cigarettes sold.
h. A new type of robot is invented that will pick peaches.
i. A computer game company anticipates that the future price of its games will fall much lower than the current price.

7. Explain the effect of the following situations:
b. The prices of resources used in the production of good X increase.
c. The government is paying a $1-per-unit subsidy for each unit of a good produced.
d. The incomes of consumers of normal good X increase.
e. The incomes of consumers of inferior good Y decrease.
f. Farmers are deciding what crop to plant and learn that the price of corn has fallen relative to the price of cotton.

8. Explain why the market price may not be the same as the equilibrium price.

9. If a new breakthrough in manufacturing technology reduces the cost of producing DVD players by half, what will happen to the a. supply of DVD players? b. demand for DVD players? c. equilibrium price and quantity of DVD players? d. demand for DVDs?

10. The U.S. Postal Service is facing increased competition from firms providing overnight delivery of packages and letters. Additional competition has emerged because communications can be sent by email, fax machines, and text messaging. What will be the effect of this competition on the market demand for mail delivered by the post office?

11. There is a shortage of college basketball and football tickets for some games, and a surplus occurs for other games. Why do shortages and surpluses exist for different games?

12. Explain the statement “People respond to incentives and disincentives” in relation to the demand curve and supply curve for good X.

For Online Exercises, go to the Tucker Web site at www.cengage.com/economics/tucker.
CHECKPOINT ANSWERS

Can Gasoline Become an Exception to the Law of Demand?

As the price of gasoline began to rise, the expectation of still higher prices caused buyers to buy more now, and therefore, demand increased. As shown in Exhibit 13, suppose the price per gallon of gasoline was initially at $P_1$ and the quantity demanded was $Q_1$ on demand curve $D_1$ (point A). Then the war in the Middle East caused the demand curve to shift rightward to $D_2$. Along the new demand curve, $D_2$, consumers increased their quantity demanded to $Q_2$ at the higher price of $P_2$ per gallon of gasoline (point B).

The expectation of rising gasoline prices in the future caused “an increase in demand,” rather than “an increase in quantity demanded” in response to a higher price. If you said there are no exceptions to the law of demand, YOU ARE CORRECT.

Can the Law of Supply Be Repealed for the Oil Market?

There is not a single quantity of oil—say, 3 million barrels—for sale in the world on a given day. The supply curve for oil is not vertical. As the law of supply states, higher oil prices will cause greater quantities of oil to be offered for sale. At lower prices, oil producers have less incentive to drill deeper for oil that is more expensive to discover.

The government cannot repeal the law of supply. Price controls discourage producers from oil exploration and production, which causes a reduction in the quantity supplied. If you said U.S. oil production decreased in the 1970s when the government put a lid on oil prices, YOU ARE CORRECT.

Can the Price System Eliminate Scarcity?

Recall from Chapter 1 that scarcity is the condition in which human wants are forever greater than the resources available to satisfy those wants. Using markets free from government interference will not solve the scarcity problem. Scarcity exists at any price for a good or service. This means scarcity occurs at any disequilibrium price at which a shortage or surplus exists, and scarcity remains at any equilibrium price at which no shortage or surplus exists.

Although the price system can eliminate shortages (or surpluses), if you said it cannot eliminate scarcity, YOU ARE CORRECT.
Practice Quiz

For an explanation of the correct answers, visit the Tucker Web site at www.cengage.com/economics/tucker.

1. If the demand curve for good X is downward sloping, an increase in the price will result in
   a. an increase in the demand for good X.
   b. a decrease in the demand for good X.
   c. no change in the quantity demanded for good X.
   d. a larger quantity demanded for good X.
   e. a smaller quantity demanded for good X.

2. The law of demand states that the quantity demanded of a good changes, other things being equal, when
   a. the price of the good changes.
   b. consumer income changes.
   c. the prices of other goods change.
   d. a change occurs in the quantities of other goods purchased.

3. Which of the following is the result of a decrease in the price of tea, other things being equal?
   a. A leftward shift in the demand curve for tea
   b. A downward movement along the demand curve for tea
   c. A rightward shift in the demand curve for tea
   d. An upward movement along the demand curve for tea

4. Which of the following will cause a movement along the demand curve for good X?
   a. A change in the price of a close substitute
   b. A change in the price of good X
   c. A change in consumer tastes and preferences for good X
   d. A change in consumer income

5. Assuming beef and pork are substitutes, a decrease in the price of pork will cause the demand curve for beef to
   a. shift to the left as consumers switch from beef to pork.
   b. shift to the right as consumers switch from beef to pork.
   c. remain unchanged, because beef and pork are sold in separate markets.
   d. none of the above.

6. Assuming coffee and tea are substitutes, a decrease in the price of coffee, other things being equal, results in a (an)
   a. downward movement along the demand curve for tea.
   b. leftward shift in the demand curve for tea.
   c. upward movement along the demand curve for tea.
   d. rightward shift in the demand curve for tea.

7. Assuming steak and potatoes are complements, a decrease in the price of steak will
   a. decrease the demand for steak.
   b. increase the demand for steak.
   c. increase the demand for potatoes.
   d. decrease the demand for potatoes.

8. Assuming steak is a normal good, a decrease in consumer income, other things being equal, will
   a. cause a downward movement along the demand curve for steak.
   b. shift the demand curve for steak to the left.
   c. cause an upward movement along the demand curve for steak.
   d. shift the demand curve for steak to the right.

9. An increase in consumer income, other things being equal, will
   a. shift the supply curve for a normal good to the right.
   b. cause an upward movement along the demand curve for an inferior good.
   c. shift the demand curve for an inferior good to the left.
   d. cause a downward movement along the supply curve for a normal good.

10. Yesterday seller A supplied 400 units of good X at $10 per unit. Today seller A supplies the same quantity of units at $5 per unit. Based on this evidence, seller A has experienced a (an)
    a. decrease in supply.
    b. increase in supply.
    c. increase in the quantity supplied.
Practice Quiz Continued

d. decrease in the quantity supplied.
e. increase in demand.

11. An improvement in technology causes a (an)
a. leftward shift of the supply curve.
b. upward movement along the supply curve.
c. firm to supply a larger quantity at any given price.
d. downward movement along the supply curve.

12. Suppose autoworkers receive a substantial wage increase. Other things being equal, the price of autos will rise because of a (an)
a. increase in the demand for autos.
b. rightward shift of the supply curve for autos.
c. leftward shift of the supply curve for autos.
d. reduction in the demand for autos.

13. Assuming soybeans and tobacco can be grown on the same land, an increase in the price of tobacco, other things being equal, causes a (an)
a. upward movement along the supply curve for soybeans.
b. downward movement along the supply curve for soybeans.
c. rightward shift in the supply curve for soybeans.
d. leftward shift in the supply curve for soybeans.

14. If \( Q_d \) = quantity demanded and \( Q_s \) = quantity supplied at a given price, a shortage in the market results when
a. \( Q_s \) is greater than \( Q_d \).
b. \( Q_s \) equals \( Q_d \).
c. \( Q_d \) is less than or equal to \( Q_s \).
d. \( Q_d \) is greater than \( Q_s \).

15. Assume that the equilibrium price for a good is $10. If the market price is $5, a
a. shortage will cause the price to remain at $5.
b. surplus will cause the price to remain at $5.
c. shortage will cause the price to rise toward $10.
d. surplus will cause the price to rise toward $10.

16. In the market shown in Exhibit 14, the equilibrium price and quantity of good X are
a. $0.50, 200.
b. $1.50, 300.
c. $2.00, 100.
d. $1.00, 200.

17. In Exhibit 14, at a price of $2.00, the market for good X will experience a
a. shortage of 150 units.
b. surplus of 100 units.
c. shortage of 100 units.
d. surplus of 200 units.

18. In Exhibit 14, if the price of good X moves from $1.00 to $2.00, the new market condition will put
a. upward pressure on price.
b. no pressure on price to change.
c. downward pressure on price.
d. no pressure on quantity to change.
Practice Quiz Continued

19. In Exhibit 14, if the market price of good X is initially $0.50, a movement toward equilibrium requires
   a. no change, because an equilibrium already exists.
   b. the price to fall below $0.50 and both the quantity supplied and the quantity demanded to rise.
   c. the price to remain the same, but the supply curve to shift to the left.
   d. the price to rise above $0.50, the quantity supplied to rise, and the quantity demanded to fall.

20. In Exhibit 14, if the market price of good X is initially $1.50, a movement toward equilibrium requires
   a. no change, because an equilibrium already exists.
   b. the price to fall below $1.50 and both the quantity supplied and the quantity demanded to fall.
   c. the price to remain the same, but the supply curve to shift to the left.
   d. the price to fall below $1.50, the quantity supplied to fall, and the quantity demanded to rise.
Consumer Surplus, Producer Surplus, and Market Efficiency

This chapter explained how the market forces of demand and supply establish the equilibrium price and output. Here it will be demonstrated that the equilibrium price and quantity determined in a competitive market are desirable because the result is *market efficiency*. To understand this concept, we use the area between the market price and the demand and supply curves to measure gains or losses from market transactions for consumers and producers.

### Consumer Surplus

Consider the market demand curve shown in Exhibit A-1(a). The height of this demand curve shows the maximum willingness of consumers to purchase ground beef at various prices per pound. At a price of $4.00 (point X) no one will purchase ground beef. But if the price drops to $3.50 at point A, consumers will purchase one million pounds of ground beef per year. Moving downward along the demand curve to point B, consumers will purchase an additional million pounds of ground beef per year at a lower price of $3.00 per pound. If the price continues to drop to $2.50 per pound at point C and lower, consumers are willing to purchase more pounds of ground beef consistent with the law of demand.

Assuming the market equilibrium price for ground beef is $2.00 per pound, we can use the demand curve to measure the net benefit, or *consumer surplus*, in this market. **Consumer surplus** is the value of the difference between the price consumers are willing to pay for a product on the demand curve and the price actually paid for it. At point A, consumers are willing to pay $3.50 per pound, but they actually pay the equilibrium price of $2.00. Thus, consumers earn a surplus of $1.50 ($3.50 − $2.00) per pound multiplied by one million pounds purchased, which is a $15 million consumer surplus. This value is represented by the shaded vertical rectangle formed at point A on the demand curve. At point B, consumers who purchase an additional million pounds of ground beef at $3.00 per pound receive a lower extra consumer surplus than at point A, represented by a rectangle of lower height. At point C, the marginal consumer surplus continues to fall until at equilibrium point E, where there is no consumer surplus.

The total value of consumer surplus can be interpreted from the explanation given above. As shown in Exhibit A-1(b), begin at point X and instead of selected prices, now imagine offering ground beef to consumers at each possible price.
As illustrated in part (a), consumers are willing at point $A$ on the market demand curve to pay $3.50 per pound to purchase one million pounds of ground beef per year. Since the equilibrium price is $2.00, this means they receive a consumer surplus of $1.50 for each pound of ground beef and the vertical shaded rectangular area is the consumer surplus earned only at point $A$. Others who pay less at points $B$, $C$, and $E$ receive less consumer surplus and the height of the corresponding rectangles falls at each of these prices. In part (b), moving downward along all possible prices on the demand curve yields the green shaded triangle, which is equal to total consumer surplus (net benefit).

**CONCLUSION** Total consumer surplus measured in dollars is represented by the total area under the market demand curve and above the equilibrium price.

**Producer Surplus**

Similar to the concept of consumer surplus, the height of the market supply curve in Exhibit A-2(a) shows the producers’ minimum willingness to accept payment for ground beef offered for sale at various prices per pound. At point $X$, firms offer
Exhibit A-2  Market Supply Curve and Producer Surplus

In part (a), firms are willing at $0.50 (point A) to supply one million pounds of ground beef per year. Because $2.00 is the equilibrium price, the sellers earn a producer surplus of $1.50 per pound of ground beef sold. The first vertical shaded rectangle is the producer surplus earned only at point A. At points B, C, and E, sellers receive less producer surplus at each of these higher prices and the sizes of the rectangles fall. In part (b), moving upward along all possible selling prices on the supply curve yields the red-shaded triangle that is equal to total producer surplus (net benefit).

Again, we will assume the equilibrium price is $2.00 per pound, and the supply curve can be used to measure the net benefit, or producer surplus. Producer surplus is the value of the difference between the actual selling price of a product and the price producers are willing to sell it for on the supply curve. Now assume the first million pounds of ground beef is sold at point A on the supply curve. In this case, producer surplus is the difference between the equilibrium selling price of $2.00 and the $0.50 price that is the minimum price that producers will accept to supply this quantity of ground beef. Thus, producer surplus is equal to $1.50 ($2.00 - $0.50) per pound multiplied by one million pounds sold, which is $1.5 million producer surplus. This value is represented by the vertical shaded rectangle formed at point A on the supply curve. The second million pounds of ground beef offered for sale at point B also generates a producer surplus because the selling price of $2.00
exceeds the $1.00 price at which firms are willing to supply this additional quantity of ground beef. Note that producer surplus is lower at point B compared to point A, and marginal producer surplus continues to fall at point C until it reaches zero at the equilibrium point E.

The total value of producer surplus is represented in Exhibit A-2(b). Start at point X, where none of the product will be supplied at the price of zero. Now consider the quantities of ground beef producers are willing to offer for sale at each possible price upward along the supply curve until the equilibrium price of $2.00 is reached at point E. The result is that the entire red triangular area between the horizontal line at the equilibrium price and the supply curve represents total producer surplus.

CONCLUSION Total producer surplus measured in dollars is represented by the total area under the equilibrium price and above the supply curve.

Market Efficiency

In this section, the equilibrium price and quantity will be shown to achieve market efficiency because at any other market price the total net benefits to consumers and producers will be less. Stated differently, competitive markets are efficient when they maximize the sum of consumer and producer surplus. The analysis continues in Exhibit A-3(a), which combines parts (b) from the two previous exhibits. The green triangle represents consumer surplus earned in excess of the $2.00 equilibrium price consumers pay for ground beef. The red triangle represents producer surplus producers receive by selling ground beef at $2.00 per pound in excess of the minimum price at which they are willing to supply it. The total net benefit (total surplus) is therefore the entire triangular area consisting of both the green consumer surplus and red producer surplus triangles.

Now consider in Exhibit A-3(b) the consequences to market efficiency of producers devoting fewer resources to ground beef production and only 2 million pounds being bought and sold per year compared with 4 million pounds at the equilibrium price of $2.00. The result is a deadweight loss. Deadweight loss is the net loss of consumer and producer surplus from underproduction or overproduction of a product. In Exhibit A-3(b), the deadweight loss is equal to the gray triangle ABE, which represents the total surplus of green and red triangles in part (a) that is not obtained because the market is operating below equilibrium point E.

Exhibit A-3(c) illustrates that a deadweight loss of consumer and producer surplus can also result from overproduction. Now suppose more resources are devoted to production and 6 million pounds of ground beef are bought and sold per year compared to the equilibrium price of $2.00. However, from the producers’ side of the market, the equilibrium selling price is only $2.00 and below any possible selling price on the supply curve between points E and C. Therefore, firms have a net loss for each pound sold, represented by the area under the supply curve and bounded below by the horizontal equilibrium price line. Similarly, consumers pay the equilibrium price of $2.00, but this price exceeds any price consumers are willing to pay between points E and D on the demand curve. This means consumers experience a total net benefit loss for each pound purchased, represented by the rectangular area between...
Exhibit A-3  Comparison of Market Efficiency and Deadweight Loss

In part (a), the green triangle represents consumer surplus and the red triangle represents producer surplus. The total net benefit, or total surplus, is the entire triangle consisting of the consumer and producer surplus triangles.

In part (b), too few resources are used to produce 2 million pounds of ground beef compared to 4 million pounds at equilibrium point $E$. The market is inefficient because the deadweight loss gray triangle $ABE$ is no longer earned by either consumers or producers.

As shown in part (c), overproduction at the equilibrium price of $2.00 can also be inefficient. If 6 million pounds of ground beef are offered for sale, too many resources are devoted to this product and a deadweight loss of area $EDC$ occurs.

(a) Consumer surplus and producer surplus equal total surplus

(b) Deadweight loss from underproduction

(c) Deadweight loss from overproduction
the horizontal equilibrium price line above and the demand curve below. The total net loss of consumer and producer surplus (deadweight loss) is equal to the gray-shaded area $EDC$.

**Conclusion** *The total dollar value of potential benefits not achieved is the deadweight loss resulting from too few or too many resources used in a given market.*

Looking ahead, the conclusion drawn from this appendix is that market equilibrium is efficient, but this conclusion is not always the case. In the next chapter, the topic of **market failure** will be discussed, in which market equilibrium under certain conditions can result in too few or too many resources being used to produce goods and services. For example, the absence of a competitive market, existence of pollution, or vaccinations to prevent a disease can establish equilibrium conditions with misallocations of resources. In these cases, government intervention may be preferable in order to achieve optimal allocation of resources. In other cases, such as the government imposing price ceilings and price floors, the result of government intervention is a market that is no longer efficient.
Key Concepts

Consumer surplus
Producer surplus
Deadweight loss

Summary

- **Consumer surplus** measures the value between the price consumers are willing to pay for a product along the demand curve and the price they actually pay.
- **Producer surplus** measures the value between the actual selling price of a product and the price along the supply curve at which sellers are willing to sell the product. Total surplus is the sum of consumer surplus and producer surplus.
- **Deadweight loss** is the result of a market that operates in disequilibrium. It is the net loss of both consumer and producer surplus resulting from underproduction or overproduction of a product.

Summary of Conclusion Statements

- Total consumer surplus measured in dollars is represented by the total area under the market demand curve and above the equilibrium price.
- Total producer surplus measured in dollars is represented by the total area under the equilibrium price and above the supply curve.
- The total dollar value of potential benefits not achieved is the deadweight loss resulting from too few or too many resources used in a given market.

Study Questions and Problems

1. Consider the market for used textbooks. Use Exhibit A-4 to calculate the total consumer surplus.
2. Consider the market for used textbooks. Use Exhibit A-5 to calculate the total producer surplus.

**Exhibit A-4**

<table>
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<tr>
<th>Potential buyer</th>
<th>Willingness to pay</th>
<th>Market price</th>
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</thead>
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<tr>
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<td>Jamie</td>
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<td>30</td>
</tr>
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<td>Frank</td>
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</table>

**Exhibit A-5**

<table>
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<th>Market price</th>
</tr>
</thead>
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<td>Betty</td>
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</tr>
<tr>
<td>Alan</td>
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<tr>
<td>Paul</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Alice</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>
3. Using Exhibits A-4 and A-5 above, calculate the total surplus. Now calculate the effect on consumer surplus, producer surplus, and total surplus of a fall in the equilibrium price of textbooks from $30 to $15 each. Explain the meaning of your calculations.

4. Using Exhibit A-6, and assuming the market is in equilibrium at $Q_e$, identify areas \( ACD \), \( DCE \), and \( ACE \). Now explain the result of underproduction at \( Q \) in terms of areas \( BCG \), \( GCF \), and \( BCF \).

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Practice Quiz

For an explanation of the correct answers, visit the Tucker Web site at www.cengage.com/economics/tucker.

1. If Bill is willing to pay $10 for one good \( X \), $8 for a second, and $6 for a third, and the market price is $5, then Bill’s consumer surplus is
   a. $24.
   b. $18.
   c. $9.
   d. $6.

2. Suppose Gizmo Inc. is willing to sell one gizmo for $10, a second gizmo for $12, a third for $14, and a fourth for $20, and the market price is $20. What is Gizmo Inc.’s producer surplus?
   a. $56.
   b. $24.
   c. $20.
   d. $10.

3. In an efficient market, deadweight loss is
   a. maximum.
   b. minimum.
   c. constant.
   d. zero.

4. Deadweight loss results from
   a. equilibrium.
   b. underproduction.
   c. overproduction.
   d. none of the above are correct.
   e. Either (b) or (c).

5. Total surplus equals
   a. consumer surplus + producer surplus = deadweight loss.
   b. consumer surplus = producer surplus = deadweight loss.
   c. consumer surplus = producer surplus + deadweight loss.
   d. consumer surplus + producer surplus.

6. Which of the following statements is correct?
   a. Total surplus is the sum of consumer and producer surplus.
   b. Deadweight loss is the net loss of both consumer and producer surplus.
   c. Deadweight loss is a measure of market inefficiency.
   d. All of the above.
Practice Quiz Continued

7. In Exhibit A-7, suppose firms devote resources sufficient to produce 4,000 units of good X per month. The result is a deadweight loss of triangle:
   a. $\text{ABE}$.
   b. $\text{CDE}$.
   c. $\text{EGE}$.
   d. $\text{EDE}$.

8. Suppose in Exhibit A-7 that exchange in the market for good X yields triangle $\text{ABE}$. This means that which of the following conditions exists in the market?
   a. Only consumer surplus
   b. Only producer surplus
   c. Deadweight loss
   d. Maximum consumer plus producer surplus

9. As shown in Exhibit A-7, assume that the quantity of good X exchanged results in triangle $\text{EIH}$. This would be caused by _______ resources being used by producers to produce good X.
   a. too many
   b. too few
   c. an optimal amount of
   d. asymmetric

10. As shown in Exhibit A-7, assume that the quantity of good X exchanged results in triangle $\text{CDE}$. This would be caused by _______ resources being used by producers to produce good X.
    a. too many
    b. too few
    c. an optimal amount of
    d. asymmetric
Classical economic theory held that the economy would bounce back to full employment as long as prices and wages were flexible. As the unemployment rate soared and remained high during the Great Depression, British economist John Maynard Keynes formulated a new theory with new policy implications. Instead of taking a wait-and-see policy until markets self-correct the economy, Keynes argued that policymakers must take action to influence aggregate spending through changes in government spending. The prescription for the Great Depression was simple: Increase government spending and jobs will be created. Faced with the current financial crisis, Keynesian management of the economy is currently being used to stabilize the U.S. and global economy. Keynes himself would be amazed at the scale and scope of what is happening. The opposition view today is based on the classical model that rejects the federal government stimulus package concept because the economy will self-correct to full employment.

In this chapter, you will use aggregate demand and supply analysis to study the business cycle. The chapter opens with a presentation of the aggregate demand curve and then the aggregate supply curve. Once these concepts are developed, the analysis shows why modern macroeconomics teaches that shifts in aggregate supply or aggregate demand can influence the price level, the equilibrium level of real GDP, and employment. For example, although Keynes was not concerned with the problem of inflation, his theory has implications for fighting demand-pull inflation. In this case, the government must cut spending or increase taxes to reduce aggregate demand. You will probably return to this chapter often because it provides the basic tools with which to organize your thinking about the macro economy.
THE AGGREGATE DEMAND CURVE

Here we view the collective demand for all goods and services, rather than the market demand for a particular good or service. Exhibit 1 shows the aggregate demand curve (AD), which slopes downward and to the right for a given year. The aggregate demand curve shows the level of real GDP purchased by households, businesses, government, and foreigners (net exports) at different possible price levels during a time period, ceteris paribus. Stated differently, the aggregate demand curve shows us the total dollar amount of goods and services that will be demanded in the economy at various price levels. As for the demand curve for an individual market, the lower the economywide price level, the greater the aggregate quantity demanded for real goods and services, ceteris paribus.

The downward slope of the aggregate demand curve shows that at a given level of aggregate income, people buy more goods and services at a lower average price level. While the horizontal axis in the market supply and demand model measures physical units, such as bushels of wheat, the horizontal axis in the aggregate demand and supply model measures the value of final goods and services included in real GDP. Note that the horizontal axis represents the quantity of aggregate production demanded, measured in base-year dollars. The vertical axis is an index of the overall price level, such as the chain price index or the CPI, rather than the price per bushel of wheat. As shown in Exhibit 1, if the price level measured by the CPI is 300 at point A, a real GDP of $8 trillion is demanded in a given year. If the price level is 200 at point B, a real GDP of $12 trillion is demanded. Note that hypothetical data is used throughout this chapter and the next unless otherwise stated.

Although the aggregate demand curve looks like a market demand curve, these concepts are different. As we move along a market demand curve, the price of related goods is assumed to be constant. But when we deal with changes in the general or average price level in an economy, this assumption is meaningless because we are using a market basket measure for all goods and services.

CONCLUSION The aggregate demand curve and the demand curve are not the same concept.
The aggregate demand curve (AD) shows the relationship between the price level and the level of real GDP, other things being equal. The lower the price level, the larger the GDP demanded by households, businesses, government, and foreigners. If the price level is 300 at point A, a real GDP of $8 trillion is demanded. If the price level is 200 at point B, the real GDP demanded increases to $12 trillion.

**Reasons for the Aggregate Demand Curve’s Shape**

The reasons for the downward slope of an aggregate demand curve include the real balances effect, the interest-rate effect, and the net exports effect.

**Real Balances Effect**

Recall from the discussion in the chapter on inflation that cash, checking deposits, savings accounts, and certificates of deposit are examples of financial assets whose real value changes with the price level. If prices are falling, the purchasing power
of households rises and they are more willing and able to spend. Suppose you have $1,000 in a checking account with which to buy 10 weeks’ worth of groceries. If prices fall by 20 percent, $1,000 will now buy enough groceries for 12 weeks. This rise in your real wealth may make you more willing and able to purchase a new iPhone out of current income.

**CONCLUSION** Consumers spend more on goods and services when lower prices make their dollars more valuable. Therefore, the real value of money is measured by the quantity of goods and services each dollar buys.

When inflation reduces the real value of fixed-value financial assets held by households, the result is lower consumption, and real GDP falls. The effect of the change in the price level on real consumption spending is called the **real balances effect**. The real balances effect is the impact on total spending (real GDP) caused by the inverse relationship between the price level and the real value of financial assets with fixed nominal value.

**Interest-Rate Effect**

The second reason why the aggregate demand curve is downward sloping involves the **interest-rate effect**. The interest-rate effect is the impact on total spending (real GDP) caused by the direct relationship between the price level and the interest rate. A key assumption of the aggregate demand curve is that the supply of money available for borrowing remains fixed. A high price level means people must take more dollars from their wallets and checking accounts in order to purchase goods and services. At a higher price level, the demand for borrowed money to buy products also increases and results in a higher cost of borrowing, that is, higher interest rates. Rising interest rates discourage households from borrowing to purchase homes, cars, and other consumer products. Similarly, at higher interest rates, businesses cut investment projects because the higher cost of borrowing diminishes the profitability of these investments. Thus, assuming fixed credit, an increase in the price level translates through higher interest rates into a lower real GDP.

**Net Exports Effect**

Whether American-made goods have lower prices than foreign goods is another important factor in determining the aggregate demand curve. A higher domestic price level tends to make U.S. goods more expensive than foreign goods, and imports rise because consumers substitute imported goods for domestic goods. An increase in the price of U.S. goods in foreign markets also causes U.S. exports to decline. Consequently, a rise in the domestic price level of an economy tends to increase imports, decrease exports, and thereby reduce the net exports component of real GDP. This condition is the **net exports effect**. The net exports effect is the impact on total spending (real GDP) caused by the inverse relationship between the price level and the net exports of an economy.

Exhibit 2 summarizes the three effects that explain why the aggregate demand curve in Exhibit 1 is downward sloping.
NONPRICE-LEVEL DETERMINANTS OF AGGREGATE DEMAND

As was the case with individual demand curves, we must distinguish between changes in real GDP demanded, caused by changes in the price level, and changes in aggregate demand, caused by changes in one or more of the nonprice-level determinants. Once the ceteris paribus assumption is relaxed, changes in variables other than the price level cause a change in the location of the aggregate demand curve. Nonprice-level determinants include the consumption \( C \), investment \( I \), government spending \( G \), and net exports \( X - M \) components of aggregate expenditures explained in the chapter on GDP.

CONCLUSION Any change in the individual components of aggregate expenditures shifts the aggregate demand curve.

Exhibit 3 illustrates the link between an increase in expenditures and an increase in aggregate demand. Begin at point A on aggregate demand curve \( AD_1 \), with a price level of 200 and a real GDP of $12 trillion. Assume the price level remains constant at 200 and the aggregate demand curve increases from \( AD_1 \) to \( AD_2 \). Consequently, the level of real GDP rises from $12 trillion (point A) to $16 trillion (point B) at the price level of 200. The cause might be that consumers have become more optimistic about the future and their consumption expenditures \( C \) have risen. Or possibly an increase in business optimism has increased profit expectations, and the level of investment \( I \) has risen because businesses are spending more for plants and equipment. The same increase in aggregate demand could also have been caused by
Exhibit 3  A Shift in the Aggregate Demand Curve

At the price level of 200, the real GDP level is $12 trillion at point A on $AD_1$. An increase in one of the nonprice-level determinants of consumption ($C$), investment ($I$), government spending ($G$), or net exports ($X - M$) causes the level of real GDP to rise to $16 trillion at point $B$ on $AD_2$. Because this effect occurs at any price level, an increase in aggregate expenditures shifts the $AD$ curve rightward. Conversely, a decrease in aggregate expenditures shifts the $AD$ curve leftward.

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<td>10</td>
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</tr>
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<td>20</td>
<td>24</td>
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</tbody>
</table>

**CAUSATION CHAIN**

- Increase in nonprice-level determinants: $C, I, G, (X - M)$
- Increase in the aggregate demand curve

A boost in government spending ($G$) or a rise in net exports ($X - M$). A swing to pessimistic expectations by consumers or firms will cause the aggregate demand curve to shift leftward. A leftward shift in the aggregate demand curve may also be caused by a decrease in government spending or net exports.

**THE AGGREGATE SUPPLY CURVE**

Just as we must distinguish between the aggregate demand and market demand curves, the theory for a market supply curve does not apply directly to the aggregate supply curve. Keeping this condition in mind, we can define the aggregate supply curve ($AS$)
as the curve that shows the level of real GDP produced at different possible price levels during a time period, ceteris paribus. Stated simply, the aggregate supply curve shows us the total dollar amount of goods and services produced in an economy at various price levels. Given this general definition, we must pause to discuss two opposing views—the Keynesian horizontal aggregate supply curve and the classical vertical aggregate supply curve.

### Keynesian View of Aggregate Supply

In 1936, John Maynard Keynes published *The General Theory of Employment, Interest, and Money*. In this book, Keynes argued that price and wage inflexibility during a depression or recession means that unemployment can be a prolonged affair. Unless an economy trapped in a depression or severe recession is rescued by an increase in aggregate demand, full employment will not be achieved. This Keynesian prediction calls for government to intervene and actively manage aggregate demand to avoid a depression or recession.

How can Keynesians assume that product prices and wages are fixed? Reasons for upward inflexibility include: First, during a deep recession or depression, there are many idle resources in the economy. Consequently, producers are willing to sell at current prices because there are no shortages to put upward pressure on prices. Second, the supply of unemployed workers willing to work for the prevailing wage rate diminishes the power of workers to increase their wages. Reasons for downward inflexibility include: First, union contracts prevent businesses from lowering wage rates. Second, minimum wage laws prevent lower wages. Third, employers believe that cutting wages lowers worker morale and productivity. Therefore, during a recession employers prefer to freeze wages and lay off or reduce hours for some of their workers until the economy recovers. In fact, the CPI for the last month of each recession since 1948 was at or above the CPI for the first month of the recession. Given the Keynesian assumption of fixed or rigid product prices and wages, changes in the aggregate demand curve cause changes in real GDP along a horizontal aggregate supply curve. In short, Keynesian theory argues that only shifts in aggregate demand can revitalize a depressed economy.

Exhibit 4 portrays the core of Keynesian theory. We begin at equilibrium $E_1$, with a fixed price level of 200. Given aggregate demand schedule $AD_1$, the equilibrium level of real GDP is $8$ trillion. Now government spending ($G$) increases, causing aggregate demand to rise from $AD_1$ to $AD_2$ and equilibrium to shift from $E_1$ to $E_2$ along the horizontal aggregate supply curve ($AS$). At $E_2$, the economy moves to $12$ trillion, which is closer to the full-employment GDP of $16$ trillion.

### Conclusion

When the aggregate supply curve is horizontal and an economy is in recession below full employment, the only effects of an increase in aggregate demand are increases in real GDP and employment, while the price level does not change. Stated simply, the Keynesian view is that “demand creates its own supply.”
Classical View of Aggregate Supply

Prior to the Great Depression, a group of laissez-faire economists known as the classical economists dominated economic thinking. The founder of the classical school of economics was Adam Smith. Exhibit 5 uses the aggregate demand and supply model to illustrate the classical view that the aggregate supply curve, $AS$, is a vertical line at the full employment output of $16$ trillion. The vertical shape of the classical aggregate supply curve is based on two assumptions. First, the economy normally operates at its full-employment output level. Second, the price level of products and production costs change by the same percentage, that is, proportionally, in order to maintain...
Classical theory teaches that prices and wages adjust to keep the economy operating at its full-employment output of $16 trillion. A decline in aggregate demand from $AD_1$ to $AD_2$ will temporarily cause a surplus of $4 trillion, the distance from $E'$ to $E_1$. Businesses respond by cutting the price level from 300 to 200. As a result, consumers increase their purchases because of the real balances effect, and wages adjust downward. Thus, classical economists predict the economy is self-correcting and will restore full employment at point $E_2$. $E_1$ and $E_2$ therefore represent points along a classical vertical aggregate supply curve, $AS$.

Exhibit 5 illustrates why classical economists believe a market economy over time automatically self-corrects without government intervention to full employment. Following the classical scenario, the economy is initially in equilibrium at $E_1$, the price level is 300, real output is at its full-employment level of $16 trillion, and the aggregate demand curve $AD_1$ traces total spending. Now suppose private spending falls because households and businesses are pessimistic about economic conditions. This condition causes $AD_1$ to shift leftward to $AD_2$. At a price level of 300, the immediate effect is that aggregate output exceeds aggregate spending by $4 trillion ($E_1$ to $E'$), and unexpected inventory accumulation occurs. To eliminate...
unsold inventories resulting from the decrease in aggregate demand, business firms temporarily cut back on production and reduce the price level from 300 to 200.

At $E'$, the decline in aggregate output in response to the surplus also affects prices in the factor markets. As a result of the economy moving from point $E_1$ to $E'$, there is a decrease in the demand for labor, natural resources, and other inputs used to produce products. This surplus condition in the factor markets means that some workers who are willing to work are laid off and compete with those who still have jobs by reducing their wage demands. Owners of natural resources and capital likewise cut their prices.

How can the classical economists believe that prices and wages are completely flexible? The answer is contained in the real balances effect, explained earlier. When businesses reduce the price level from 300 to 200, the cost of living falls by the same proportion. Once the price level falls by 33 percent, a nominal or money wage rate of, say, $21 per hour will purchase 33 percent more groceries after the fall in product prices than it would before the fall. Workers will, therefore, accept a pay cut of 33 percent, or $7 per hour. Any worker who refuses the lower wage rate of $14 per hour will be replaced by an unemployed worker willing to accept the going rate.

Exhibit 5 shows an economywide proportional fall in prices and wages by the movement downward along $AD_2$ from $E'$ to a new equilibrium at $E_2$. At $E_2$, the economy has self-corrected through downwardly flexible prices and wages to its full-employment level of $16$ trillion worth of real GDP at the lower price level of 200. $E_1$ and $E_2$ therefore represent points along a classical vertical aggregate supply curve, $AS$. (The classical model is explained in more detail in the appendix to this chapter.)

**CONCLUSION** When the aggregate supply curve is vertical at the full-employment GDP, the only effect over time of a change in aggregate demand is a change in the price level. Stated simply, the classical view is that “supply creates its own demand.”

Although Keynes himself did not use the $AD$-$AS$ model, we can use Exhibit 5 to distinguish between Keynes’s view and the classical theory of flexible prices and wages. Keynes believed that once the demand curve has shifted from $AD_1$ to $AD_2$, the surplus (the distance from $E'$ to $E_1$) will persist because he rejected price-wage downward flexibility. The economy therefore will remain at the less-than-full-employment output of $12$ trillion until the aggregate demand curve shifts rightward and returns to its initial position at $AD_1$.

**CONCLUSION** Keynesian theory rejects classical theory for an economy in recession because Keynesians argue that during a recession prices and wages do not adjust downward to restore an economy to full-employment real GDP.

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1. This quotation is known as Say’s Law, named after the French classical economist Jean-Baptiste Say (1767–1832).
Three Ranges of the Aggregate Supply Curve

Having studied the differing theories of the classical economists and Keynes, we will now discuss an eclectic or general view of how the shape of the aggregate supply curve varies as real GDP expands or contracts. The aggregate supply curve, $AS$, in Exhibit 6 has three quite distinct ranges or segments, labeled (1) Keynesian range, (2) intermediate range, and (3) classical range.

The Keynesian range is the horizontal segment of the aggregate supply curve, which represents an economy in a severe recession. In Exhibit 6, below real GDP $Y_K$, the price level remains constant as the level of real GDP rises. Between $Y_K$ and the full-employment output of $Y_F$, the price level rises as the real GDP level rises. The intermediate range is the rising segment of the aggregate supply curve, which represents an economy approaching full-employment output. Finally, at $Y_F$, the level of real GDP remains constant, and only the price level rises.

Exhibit 6 The Three Ranges of the Aggregate Supply Curve

The aggregate supply curve shows the relationship between the price level and the level of real GDP supplied. It consists of three distinct ranges: (1) a Keynesian range between 0 and $Y_K$, wherein the price level is constant for an economy in severe recession; (2) an intermediate range between $Y_K$ and $Y_F$, where both the price level and the level of real GDP vary as an economy approaches full employment; and (3) a classical range, where the price level can vary, while the level of real GDP remains constant at the full-employment level of output, $Y_F$. 
The classical range is the vertical segment of the aggregate supply curve, which represents an economy at full-employment output. We will now examine the rationale for each of these three quite distinct ranges.

**Aggregate Demand and Aggregate Supply Macroeconomic Equilibrium**

In Exhibit 7, the macroeconomic equilibrium level of real GDP corresponding to the point of equality, $E$, is $8$ trillion, and the equilibrium price level is $200$. This is the unique combination of price level and output level that equates how much people want to buy with the amount businesses want to produce and sell. Because the entire real GDP value of final products is bought and sold at the price level of $200$, there is no upward or downward pressure for the macroeconomic equilibrium to change. Note that the economy shown in Exhibit 7 is operating on the edge of the Keynesian range, with a negative GDP gap of $8$ trillion.

Suppose that in Exhibit 7 the level of output on the $AS$ curve is below $8$ trillion and the $AD$ curve remains fixed. At a price level of $200$, the real GDP demanded exceeds the real GDP supplied. Under such circumstances, businesses cannot fill orders quickly enough, and inventories are drawn down unexpectedly. Business managers react by hiring more workers and producing more output. Because the economy

---

**Exhibit 7**  
The Aggregate Demand and Aggregate Supply Model

Macroeconomic equilibrium occurs where the aggregate demand curve, $AD$, and the aggregate supply curve, $AS$, intersect. In this case, equilibrium, $E$, is located at the far end of the Keynesian range, where the price level is $200$ and the equilibrium output is $8$ trillion. In macroeconomic equilibrium, businesses neither overestimate nor underestimate the real GDP demanded at the prevailing price level.
is operating in the Keynesian range, the price level remains constant at 200. The opposite scenario occurs if the level of real GDP supplied on the AS curve exceeds the real GDP in the intermediate range between $8 trillion and $16 trillion. In this output segment, the price level is between 200 and 400, and businesses face sales that are less than expected. In this case, unintended inventories of unsold goods pile up on the shelves, and management will lay off workers, cut back on production, and reduce prices.

This adjustment process continues until the equilibrium price level and output level are reached at point $E$ and there is no upward or downward pressure for the price level to change. Here the production decisions of sellers in the economy equal the total spending decisions of buyers during the given period of time.

**CONCLUSION** At macroeconomic equilibrium, sellers neither overestimate nor underestimate the real GDP demanded at the prevailing price level.

**CHANGES IN THE AD-AS MACROECONOMIC EQUILIBRIUM**

One explanation of the business cycle is that the aggregate demand curve moves along a stationary aggregate supply curve. The next step in our analysis therefore is to shift the aggregate demand curve along the three ranges of the aggregate supply curve and observe the impact on real GDP and the price level. As the macroeconomic equilibrium changes, the economy experiences more or fewer problems with inflation and unemployment.

**Keynesian Range**

Keynes's macroeconomic theory offered a powerful solution to the Great Depression. Keynes perceived the economy as driven by aggregate demand, and Exhibit 8(a) demonstrates this theory with hypothetical data. The range of real GDP below $8 trillion is consistent with Keynesian price and wage inflexibility. Assume the economy is in equilibrium at $E_1$, with a price level of 200 and a real GDP of $4 trillion. In this case, the economy is in recession far below the full-employment GDP of $16 trillion. The Keynesian prescription for a recession is to increase aggregate demand until the economy achieves full employment. Because the aggregate supply curve is horizontal in the Keynesian range, “demand creates its own supply.” Suppose demand shifts rightward from $AD_1$ to $AD_2$ and a new equilibrium is established at $E_2$. Even at the higher real GDP level of $8 trillion, the price level remains at 200. Stated differently, aggregate output can expand throughout this range without raising prices. This is because, in the Keynesian range, substantial idle production capacity (including property and unemployed workers competing for available jobs) can be put to work at existing prices.

**CONCLUSION** As aggregate demand increases in the Keynesian range, the price level remains constant as real GDP expands.
The effect of a rightward shift in the aggregate demand curve on the price and output levels depends on the range of the aggregate supply curve in which the shift occurs. In part (a), an increase in aggregate demand causing the equilibrium to change from $E_1$ to $E_2$ in the Keynesian range will increase real GDP from $4$ trillion to $8$ trillion, but the price level will remain unchanged at $200$.

In part (b), an increase in aggregate demand causing the equilibrium to change from $E_3$ to $E_4$ in the intermediate range will increase real GDP from $8$ trillion to $12$ trillion, and the price level will rise from $200$ to $250$.

In part (c), an increase in aggregate demand causing the equilibrium to change from $E_5$ to $E_6$ in the classical range will increase the price level from $300$ to $400$, but real GDP will not increase beyond the full-employment level of $16$ trillion.
Intermediate Range

The intermediate range in Exhibit 8(b) is between $8 trillion and $16 trillion worth of real GDP. As output increases in the range of the aggregate supply curve near the full-employment level of output, the considerable slack in the economy disappears. Assume an economy is initially in equilibrium at $E_3$ and aggregate demand increases from $AD_3$ to $AD_4$. As a result, the level of real GDP rises from $8 trillion to $12 trillion, and the price level rises from 200 to 250. In this output range, several factors contribute to inflation. First, bottlenecks (obstacles to output flow) develop when some firms have no unused capacity and other firms operate below full capacity. Suppose the steel industry is operating at full capacity and cannot fill all its orders for steel. An inadequate supply of one resource, such as steel, can hold up auto production even though the auto industry is operating well below capacity. Consequently, the bottleneck causes firms to raise the price of steel and, in turn, autos. Second, a shortage of certain labor skills while firms are earning higher profits causes businesses to expect that labor will exert its power to obtain sizable wage increases, so businesses raise prices. Wage demands are more difficult to reject when the economy is prospering because businesses fear workers will change jobs or strike. Besides, businesses believe higher prices can be passed on to consumers quite easily because consumers expect higher prices as output expands to near full capacity. Third, as the economy approaches full employment, firms must use less productive workers and less efficient machinery. This inefficiency creates higher production costs, which are passed on to consumers in the form of higher prices.

**Conclusion**

In the intermediate range, increases in aggregate demand increase both the price level and the real GDP.

Classical Range

While inflation resulting from an outward shift in aggregate demand was no problem in the Keynesian range and only a minor problem in the intermediate range, it becomes a serious problem in the classical or vertical range.

**Conclusion**

Once the economy reaches full-employment output in the classical range, additional increases in aggregate demand merely cause inflation, rather than more real GDP.

Assume the economy shown in Exhibit 8(c) is in equilibrium at $E_5$, which intersects $AS$ at the full-capacity output. Now suppose aggregate demand shifts rightward from $AD_5$ to $AD_6$. Because the aggregate supply curve $AS$ is vertical at $16 trillion, this increase in the aggregate demand curve boosts the price level from 300 to 400, but it fails to expand real GDP. The explanation is that once the economy operates at capacity, businesses raise their prices in order to ration fully employed resources to those willing to pay the highest prices.
In summary, the AD-AS model presented in this chapter is a combination of the conflicting assumptions of the Keynesian and the classical theories separated by an intermediate range, which fits neither extreme precisely. Be forewarned that in later chapters you will encounter a continuing great controversy over the shape of the aggregate supply curve. Modern-day classical economists believe the entire aggregate supply curve is steep or vertical. In contrast, Keynesian economists contend that the aggregate supply curve is much flatter or horizontal.

The AD-AS Model for 2008–2009 during the Great Recession

Exhibit 9 uses actual data to illustrate the AD-AS model. At \( E_1 \), the economy in the third quarter of 2008 was operating at a CPI of 219 and a real GDP of $13.3 trillion, which was below the full-employment real GDP of $13.4 trillion. In 2008, the

<table>
<thead>
<tr>
<th>Price level (CPI)</th>
<th>Real GDP (trillions of dollars per year)</th>
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<tbody>
<tr>
<td>219</td>
<td>12.9</td>
</tr>
<tr>
<td>212</td>
<td>13.1</td>
</tr>
<tr>
<td>12.9</td>
<td>13.1</td>
</tr>
<tr>
<td>13.3</td>
<td>13.3</td>
</tr>
</tbody>
</table>

Beginning in the third quarter of 2008 at \( E_1 \), the aggregate demand curve shifted leftward from \( E_1 \) to \( E_2 \) in the fourth quarter of 2008 along the intermediate range of the aggregate supply curve, \( AS \). The CPI fell from 219 to 212 and real GDP fell from $13.3 trillion to $13.1 trillion. Next, the aggregate demand curve decreased from \( AD_2 \) at \( E_2 \) to \( AD_3 \) at \( E_3 \) in the second quarter of 2009 along the Keynesian range of the aggregate supply curve. Here the price level remained constant and real GDP fell from $13.1 trillion to $12.9 trillion.
combination of home prices falling sharply and a plunge in stock prices destroyed household wealth. At the same time, new home construction fell rapidly, which decreased investment spending. Recall from the chapter on Gross Domestic Product that new residential housing is included in investment spending \((I)\). This recessionary condition is illustrated by a movement between \(E_1\) and \(E_2\) caused by the aggregate demand curve decreasing from \(AD_1\) to \(AD_2\) along the intermediate range of the aggregate supply curve \(AS\). At \(E_2\), in the fourth quarter of 2008, the CPI dropped to 212, and real GDP decreased from $13.3 trillion to $13.1 trillion. Next, the aggregate demand curve decreased again from \(AD_2\) to \(AD_1\) in the second quarter of 2009 along the flat Keynesian range between \(E_2\) and \(E_3\). Here the price level remained approximately constant at 212, while real GDP declined from $13.1 trillion to $12.9 trillion. Although not shown explicitly in the exhibit, the unemployment rate rose during this period from 4.7 percent to 9.5 percent.

**Nonprice-Level Determinants of Aggregate Supply**

Our discussion so far has explained changes in real GDP supplied resulting from changes in the aggregate demand curve, given a stationary aggregate supply curve. Now we consider the situation when the aggregate demand curve is stationary and the aggregate supply curve shifts as a result of changes in one or more of the nonprice-level determinants. The nonprice-level factors affecting aggregate supply include resource prices (domestic and imported), technological change, taxes, subsidies, and regulations. Note that each of these factors affects production costs. At a given price level, the profit businesses make at any level of real GDP depends on production costs. If costs change, firms respond by changing their output. Lower production costs shift the aggregate supply curve rightward, indicating greater real GDP is supplied at any price level. Conversely, higher production costs shift the aggregate supply curve leftward, meaning less real GDP is supplied at any price level.

Exhibit 10 represents a supply-side explanation of the business cycle, in contrast to the demand-side case presented in Exhibit 8. (Note that for simplicity the aggregate supply curve can be drawn using only the intermediate segment.) The economy begins in equilibrium at point \(E_1\), with real GDP at $10 trillion and the price level at 175. Then suppose labor unions become less powerful and their weaker bargaining position causes the wage rate to fall. With lower labor costs per unit of output, businesses seek to increase profits by expanding production at any price level. Hence, the aggregate supply curve shifts rightward from \(AS_1\) to \(AS_2\), and equilibrium changes from \(E_1\) to \(E_2\). As a result, real GDP increases $2 trillion, and the price level decreases from 175 to 150. Changes in other nonprice-level factors also cause an increase in aggregate supply. Lower oil prices, greater entrepreneurship, lower taxes, and reduced government regulation are other examples of conditions that lower production costs and therefore cause a rightward shift of the aggregate supply curve.

What kinds of events might raise production costs and shift the aggregate supply curve leftward? Perhaps there is war in the Persian Gulf or the Organization of Petroleum Exporting Countries (OPEC) disrupts supplies of oil, and higher energy
prices spread throughout the economy. Under such a “supply shock,” businesses decrease their output at any price level in response to higher production costs per unit. Similarly, larger-than-expected wage increases, higher taxes to protect the environment (see Exhibit 8(a) in Chapter 4), greater government regulation, or firms having to pay higher health insurance premiums would increase production costs and therefore shift the aggregate supply curve leftward. A leftward shift in the aggregate supply curve is discussed further in the next section.

Exhibit 11 summarizes the nonprice-level determinants of aggregate demand and supply for further study and review. In the chapter on monetary policy, you will learn how changes in the supply of money in the economy can also shift the aggregate demand curve and influence macroeconomic performance.
COST-PUSH AND DEMAND-PULL INFLATION REVISITED

We now apply the aggregate demand and aggregate supply model to the two types of inflation introduced in the chapter on inflation. This section begins with a historical example of cost-push inflation caused by a decrease in the aggregate supply curve. Next, another historical example illustrates demand-pull inflation, caused by an increase in the aggregate demand curve.

During the late 1970s and early 1980s, the U.S. economy experienced stagflation. Stagflation is the condition that occurs when an economy experiences the twin maladies of high unemployment and rapid inflation simultaneously. How could this happen? The dramatic increase in the price of imported oil in 1973–1974 was a villain explained by a cost-push inflation scenario. Cost-push inflation, defined in terms of our macro model, is a rise in the price level resulting from a decrease in the aggregate supply curve while the aggregate demand curve remains fixed. As a result of cost-push inflation, real output and employment decrease.

Exhibit 12(a) uses actual data to show how a leftward shift in the supply curve can cause stagflation. In this exhibit, aggregate demand curve AD and aggregate supply curve AS_{73} represent the U.S. economy in 1973. Equilibrium was at point E_1, with the price level (CPI) at 44.4 and real GDP at $4,341 billion. Then, in 1974, the impact of a major supply shock shifted the aggregate supply curve leftward from AS_{73} to AS_{74}. The explanation for this shock was the oil embargo instituted by OPEC in retaliation for U.S. support of Israel in its war with the Arabs. Assuming a stable aggregate demand curve between 1973 and 1974, the punch from the energy shock resulted in a new equilibrium at point E_2, with the 1974 CPI at 49.3. The inflation rate for 1973 was 6.2 percent and for 1974 was 11 percent \([49.3 - 44.4]/44.4 \times 100\). Real GDP fell from $4,341 billion in 1973 to $4,319 billion in 1974, and the unemployment rate (not shown directly in the exhibit) climbed from 4.9 percent to 5.6 percent between these two years.\(^2\)

Exhibit 12  Cost-Push and Demand-Pull Inflation

Parts (a) and (b) illustrate the distinction between cost-push inflation and demand-pull inflation. Cost-push inflation is inflation that results from a decrease in the aggregate supply curve. In part (a), higher oil prices in 1973 caused the aggregate supply curve to shift leftward from AS$_{73}$ to AS$_{74}$. As a result, real GDP fell from $4,341 billion to $4,319 billion, and the price level (CPI) rose from 44.4 to 49.3. This combination of higher price level and lower real output is called stagflation.

As shown in part (b), demand-pull inflation is inflation that results from an increase in aggregate demand beyond the Keynesian range of output. Government spending increased to fight the Vietnam War without a tax increase, causing the aggregate demand curve to shift rightward from $AD_{65}$ to $AD_{66}$. Consequently, real GDP rose from $3,191 billion to $3,399 billion, and the price level (CPI) rose from 31.5 to 32.4.

In contrast, an outward shift in the aggregate demand curve can result in demand-pull inflation. Demand-pull inflation, in terms of our macro model, is a rise in the price level resulting from an increase in the aggregate demand curve while the aggregate supply curve remains fixed. Again, we can use aggregate demand and supply analysis and actual data to explain demand-pull inflation. In 1965, when the unemployment rate of 4.5 percent was close to the 4 percent natural rate of unemployment, real government spending increased sharply to fight the Vietnam War without a tax increase (an income tax surcharge was enacted in 1968). The inflation rate jumped sharply from 1.6 percent in 1965 to 2.9 percent in 1966.

Exhibit 12(b) illustrates what happened to the economy between 1965 and 1966. Suppose the economy was operating in 1965 at $E_1$, which is in the intermediate output range. The impact of the increase in military spending shifted the aggregate demand curve from $AD_{65}$ to $AD_{66}$, and the economy moved upward.
You're The Economist Was John Maynard Keynes Right? Applicable Concepts: aggregate demand and aggregate supply analysis

In The General Theory of Employment, Interest, and Money, Keynes wrote:

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. . . . There are not many who are influenced by new theories after they are twenty-five or thirty years of age, so that the ideas which civil servants and politicians and even agitators apply to current events are not likely to be the newest.1

Keynes (1883–1946) is regarded as the father of modern macroeconomics. He was the son of an eminent English economist, John Neville Keynes, who was a lecturer in economics and logic at Cambridge University. Keynes was educated at Eton and Cambridge in mathematics and probability theory, but ultimately he selected the field of economics and accepted a lectureship in economics at Cambridge.

Keynes was a many-faceted man who was an honored and supremely successful member of the British academic, financial, and political upper class. He amassed a $2 million personal fortune by speculating in stocks, international currencies, and commodities. (Use CPI index numbers to compute the equivalent amount in today’s dollars.) In addition to making a huge fortune for himself, Keynes served as a trustee of King’s College and increased its endowment over tenfold.

Keynes was a prolific scholar who is best remembered for The General Theory, published in 1936. This work made a convincing attack on the classical theory that capitalism would self-correct from a severe recession. Keynes based his model on the belief that increasing aggregate demand will achieve full employment, while prices and wages remain inflexible. Moreover, his bold policy prescription was for the government to raise its spending and/or reduce taxes in order to increase the economy’s aggregate demand curve and put the unemployed back to work.

Price Level, Real GDP, and Unemployment Rate, 1933–1941

<table>
<thead>
<tr>
<th>Year</th>
<th>CPI</th>
<th>Real GDP (billions of 2000 dollars)</th>
<th>Unemployment rate (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1933</td>
<td>13.0</td>
<td>635</td>
<td>24.9%</td>
</tr>
<tr>
<td>1939</td>
<td>13.9</td>
<td>951</td>
<td>17.2</td>
</tr>
<tr>
<td>1940</td>
<td>14.0</td>
<td>1,034</td>
<td>14.6</td>
</tr>
<tr>
<td>1941</td>
<td>14.7</td>
<td>1,211</td>
<td>9.9</td>
</tr>
</tbody>
</table>


Analyze The Issue

Was Keynes correct? Based on the above data, use the aggregate demand and aggregate supply model to explain Keynes’s theory that increases in aggregate demand propel an economy toward full employment.

along the aggregate supply curve until it reached $E_2$. Holding the aggregate supply curve constant, the AD-AS model predicts that increasing aggregate demand at near full employment causes demand-pull inflation. As shown in Exhibit 12(b), real GDP increased from $3,191$ billion in 1963 to $3,399$ billion in 1966, and the CPI rose from 31.5 to 32.4. Thus, the inflation rate for 1966 was 2.9 percent $\left(\frac{32.4-31.5}{31.5}\right) \times 100$. Corresponding to the rise in real output, the unemployment rate of 4.5 percent in 1965 fell to 3.8 percent in 1966.\(^3\)

In summary, the aggregate supply and aggregate demand curves shift in different directions for various reasons in a given time period. These shifts in the aggregate supply and aggregate demand curves cause upswings and downswings in real GDP—the business cycle. A leftward shift in the aggregate demand curve, for example, can cause a recession. Whereas, a rightward shift of the aggregate demand curve can cause real GDP and employment to rise, and the economy recovers. A leftward shift in the aggregate supply curve can cause a downswing, and a rightward shift might cause an upswing.

CONCLUSION The business cycle is a result of shifts in the aggregate demand and aggregate supply curves.

INCREASE IN BOTH AGGREGATE DEMAND AND AGGREGATE SUPPLY CURVES

Let the trumpets blow! Aggregate demand and supply curves will now edify you by explaining the U.S. economy from the mid-1990s through 2000. Begin in Exhibit 13 at $E_1$ with real GDP at $8,031$ billion and the CPI at 152. As shown in the AD-AS model for 1995, the economy operated below full employment (5.6 percent unemployment rate, not explicitly shown). Over the next five years, the U.S. economy moved to $E_2$ in 2000 and experienced strong growth in real GDP (from $8,031$ billion to $9,817$ billion) and mild inflation (the CPI increased from 152 to 172, which is 13.1 percent, or 2.6 percent per year).

The movement from $E_1$ (below full employment) to $E_2$ (full employment) was caused by an increase in $AD_{95}$ to $AD_{00}$ and an increase in $AS_{95}$ to $AS_{00}$. The rightward shift in the $AS$ curve was the result of technological advances, such as the Internet and electronic commerce, which produced larger-than-usual increases in productivity at each possible price level. And, as shown earlier in Exhibit 9 of the chapter on business cycles and unemployment, the economy has returned to operating below its full-employment potential real GDP since the recession of 2001, and this negative GDP rose sharply during the recession beginning in 2007.

3. Ibid.
PART 6  MACROECONOMIC THEORY AND POLICY

Exhibit 13  A Rightward Shift in the Aggregate Demand and Supply Curves

From late 1995 through 2000, the aggregate demand curve increased from $AD_{95}$ to $AD_{00}$. Significant increases in productivity from technology advances shifted the aggregate supply curve from $AS_{95}$ to $AS_{00}$. As a result, the U.S. economy experienced strong real GDP growth to full employment with mild inflation (the CPI increased from 152 to 172).

CAUSATION CHAIN

Increase in aggregate demand and supply  Increase in real GDP  Increase in price level

CHECKPOINT

Would the Greenhouse Effect Cause Inflation, Unemployment, or Both?

You are the chair of the President’s Council of Economic Advisers. There has been an extremely hot and dry summer due to a climatic change known as the greenhouse effect. As a result, crop production has fallen drastically. The president calls you to the White House to discuss the impact on the economy. Would you explain to the president that a sharp drop in U.S. crop production would cause inflation, unemployment, or both?
The aggregate demand curve shows the level of real GDP purchased in the economy at different price levels during a period of time.

Reasons why the aggregate demand curve is downward sloping include the following three effects: (1) The real balances effect is the impact on real GDP caused by the inverse relationship between the purchasing power of fixed-value financial assets and inflation, which causes a shift in the consumption schedule. (2) The interest-rate effect assumes a fixed money supply; therefore, inflation increases the demand for money. As the demand for money increases, the interest rate rises, causing consumption and investment spending to fall. (3) The net exports effect is the impact on real GDP caused by the inverse relationship between net exports and inflation. An increase in the U.S. price level tends to reduce U.S. exports and increase imports, and vice versa.

Shift in the Aggregate Demand Curve

The aggregate supply curve shows the level of real GDP that an economy will produce at different possible price levels. The shape of the aggregate supply curve depends on the flexibility of prices and wages as real GDP expands and contracts. The aggregate supply curve has three ranges: (1) The Keynesian range of the curve is horizontal because neither the price level nor production costs will increase or decrease when there is substantial unemployment in the economy. (2) In the intermediate range, both prices and costs rise as real GDP rises toward full employment. Prices and production costs rise because of bottlenecks, the stronger bargaining power of labor, and the utilization of less-productive workers and capital. (3) The classical range is the vertical segment of the aggregate supply curve. It coincides with the full-employment output. Because output is at its maximum, increases in aggregate demand will only cause a rise in the price level.

Aggregate Supply Curve
Demand-pull inflation is inflation that results from an increase in the aggregate demand curve in both the classical and the intermediate ranges of the aggregate supply curve, while the aggregate supply curve is fixed.

**Demand-Pull Inflation**

Summary of Conclusion Statements

- Aggregate demand and aggregate supply analysis determines the equilibrium price level and the equilibrium real GDP by the intersection of the aggregate demand and aggregate supply curves. In macroeconomic equilibrium, businesses neither overestimate nor underestimate the real GDP demanded at the prevailing price level.
- Stagflation exists when an economy experiences inflation and unemployment simultaneously. Holding aggregate demand constant, a decrease in aggregate supply results in the unhealthy condition of a rise in the price level and a fall in real GDP and employment.
- Cost-push inflation is inflation that results from a decrease in the aggregate supply curve while the aggregate demand curve remains fixed. Cost-push inflation is undesirable because it is accompanied by declines in both real GDP and employment.

Cost-Push Inflation

- The aggregate demand curve and the demand curve are not the same concept.
- Consumers spend more on goods and services when lower prices make their dollars more valuable. Therefore, the real value of money is measured by the quantity of goods and services each dollar buys.
- Any change in the individual components of aggregate expenditures shifts the aggregate demand curve.
- When the aggregate supply curve is horizontal and an economy is in recession below full employment, the only effects of an increase in aggregate demand are increases in real GDP and employment, while the price level does not change. Stated simply, the Keynesian view is that “demand creates its own supply.”
- When the aggregate supply curve is vertical at the full-employment GDP, the only effect over time of a change in aggregate demand is a change in the price level. Stated simply, the classical view is that “supply creates its own demand.”
- Keynesian theory rejects classical theory for an economy in recession because Keynesians argue that during a recession prices and
wages do not adjust downward to restore an economy to full-employment real GDP.
- At macroeconomic equilibrium, sellers neither overestimate nor underestimate the real GDP demanded at the prevailing price level.
- As aggregate demand increases in the Keynesian range, the price level remains constant as real GDP expands.
- In the intermediate range, increases in aggregate demand increase both the price level and the real GDP.
- Once the economy reaches full-employment output in the classical range, additional increases in aggregate demand merely cause inflation, rather than more real GDP.
- The business cycle is a result of shifts in the aggregate demand and aggregate supply curves.

### Study Questions and Problems

1. Explain why the aggregate demand curve is downward sloping. How does your explanation differ from the reasons behind the downward-sloping demand curve for an individual product?

2. Explain the theory of the classical economists that flexible prices and wages ensure that the economy operates at full employment.

3. In which direction would each of the following changes in conditions cause the aggregate demand curve to shift? Explain your answers.
   a. Consumers expect an economic downturn.
   b. A new U.S. president is elected, and the profit expectations of business executives rise.
   c. The federal government increases spending for highways, bridges, and other infrastructure.
   d. The United States increases exports of wheat and other crops to Russia, Ukraine, and other former Soviet republics.

4. Identify the three ranges of the aggregate supply curve. Explain the impact of an increase in the aggregate demand curve in each segment.

5. Consider this statement: “Equilibrium GDP is the same as full employment.” Do you agree or disagree? Explain.

6. Assume the aggregate demand and aggregate supply curves intersect at a price level of 100. Explain the effect of a shift in the price level to 120 and to 50.

7. In which direction would each of the following changes in conditions cause the aggregate supply curve to shift? Explain your answers.
   a. The price of gasoline increases because of a catastrophic oil spill.
   b. Labor unions and all other workers agree to a cut in wages to stimulate the economy.
   c. Power companies switch to solar power, and the price of electricity falls.
   d. The federal government increases the excise tax on gasoline in order to finance a deficit.

8. Assume an economy operates in the intermediate range of its aggregate supply curve. State the direction of shift for the aggregate demand or aggregate supply curve for each of the following changes in conditions. What is the effect on the price level? On real GDP? On employment?
   a. The price of crude oil rises significantly.
   b. Spending on national defense doubles.
   c. The costs of imported goods increase.
   d. An improvement in technology raises labor productivity.

9. What shifts in aggregate supply or aggregate demand would cause each of the following conditions for an economy?
   a. The price level rises, and real GDP rises.
   b. The price level falls, and real GDP rises.
   c. The price level falls, and real GDP falls.
   d. The price level rises, and real GDP falls.
   e. The price level falls, and real GDP remains the same.
   f. The price level remains the same, and real GDP rises.
10. Explain cost-push inflation verbally and graphically, using aggregate demand and aggregate supply analysis. Assess the impact on the price level, real GDP, and employment.

11. Explain demand-pull inflation graphically using aggregate demand and supply analysis. Assess the impact on the price level, real GDP, and employment.

For Online Exercises, go to the Tucker Web site at www.cengage.com/economics/tucker.

**CHECKPOINT ANSWER**

*Would the Greenhouse Effect Cause Inflation, Unemployment, or Both?*

A drop in food production reduces aggregate supply. The decrease in aggregate supply causes the economy to contract, while prices rise. In addition to the OPEC oil embargo between 1972 and 1974, worldwide weather conditions destroyed crops and contributed to the supply shock that caused stagflation in the U.S. economy. If you said that a severe greenhouse effect would cause both higher unemployment and inflation, **YOU ARE CORRECT**.

**Practice Quiz**

For an explanation of the correct answers, visit the Tucker Web Site at www.cengage.com/economics/tucker.

1. The aggregate demand curve is defined as the
   a. net national product.
   b. sum of wages, rent, interest, and profits.
   c. real GDP purchased at different possible price levels.
   d. total dollar value of household expectations.

2. When the supply of credit is fixed, an increase in the price level stimulates the demand for credit, which, in turn, reduces consumption and investment spending. This effect is called the
   a. real balances effect.
   b. interest-rate effect.
   c. net exports effect.
   d. substitution effect.

3. The real balances effect occurs because a higher price level reduces the real value of people’s
   a. financial assets.
   b. wages.
   c. unpaid debt.
   d. physical investments.

4. The net exports effect is the inverse relationship between net exports and the _________ of an economy.
   a. real GDP
   b. GDP deflator
   c. price level
   d. consumption spending

5. Which of the following will shift the aggregate demand curve to the left?
   a. An increase in exports
   b. An increase in investment
   c. An increase in government spending
   d. A decrease in government spending
6. Which of the following will not shift the aggregate demand curve to the left?
   a. Consumers become more optimistic about the future.
   b. Government spending decreases.
   c. Business optimism decreases.
   d. Consumers become pessimistic about the future.

7. The popular theory prior to the Great Depression that the economy will automatically adjust to achieve full employment is
   a. supply-side economics.
   b. Keynesian economics.
   c. classical economics.
   d. mercantilism.

8. Classical economists believed that the
   a. price system was stable.
   b. goal of full employment was impossible.
   c. price system automatically adjusts the economy to full employment in the long run.
   d. government should attempt to restore full employment.

9. Which of the following is not a range on the eclectic or general view of the aggregate supply curve?
   a. Classical range
   b. Keynesian range
   c. Intermediate range
   d. Monetary range

10. Macroeconomic equilibrium occurs when
    a. aggregate supply exceeds aggregate demand.
    b. the economy is at full employment.
    c. aggregate demand equals aggregate supply.
    d. aggregate demand equals the average price level.

11. Along the classical or vertical range of the aggregate supply curve, a decrease in the aggregate demand curve will decrease
    a. both the price level and real GDP.
    b. only real GDP.
    c. only the price level.
    d. neither real GDP nor the price level.

12. Other factors held constant, a decrease in resource prices will shift the aggregate demand curve leftward.
    a. demand curve leftward.
    b. demand curve rightward.
    c. supply curve leftward.
    d. supply curve rightward.

13. Assuming a fixed aggregate demand curve, a leftward shift in the aggregate supply curve causes a (an)
    a. increase in the price level and a decrease in real GDP.
    b. increase in the price level and an increase in real GDP.
    c. decrease in the price level and a decrease in real GDP.
    d. decrease in the price level and an increase in real GDP.

14. An increase in the price level caused by a rightward shift of the aggregate demand curve is called
    a. cost-push inflation.
    b. supply shock inflation.
    c. demand shock inflation.
    d. demand-pull inflation.

15. Suppose workers become pessimistic about their future employment, which causes them to save more and spend less. If the economy is on the intermediate range of the aggregate supply curve, then
    a. both real GDP and the price level will fall.
    b. real GDP will fall and the price level will rise.
    c. real GDP will rise and the price level will fall.
    d. both real GDP and the price level will rise.
It can be argued that the economy is self-regulating. This means that over time the economy will move itself to full-employment equilibrium. Stated differently, this classical theory is based on the assumption that the economy might ebb and flow around it, but full employment is the normal condition for the economy regardless of gyrations in the price level. To understand this adjustment process, the $AD$-$AS$ model presented in the chapter must be extended into a more complex model called the self-correcting $AD$-$AS$ model. First, a distinction will be made between the short-run and long-run aggregate supply curves. Indeed, one of the most controversial areas of macroeconomics is the shape of the aggregate supply curve and the reasons for that shape. Second, we will explain long-run equilibrium using the self-correcting $AD$-$AS$ model. Third, this appendix concludes by using the self-correcting $AD$-$AS$ model to explain short-run and long-run adjustments to changes in aggregate demand.

### Why the Short-Run Aggregate Supply Curve is Upward Sloping

Exhibit A-1(a) shows the short-run aggregate supply curve (SRAS), which does not have either the perfectly flat Keynesian segment or the perfectly vertical classical segment developed in Exhibit 6 of this chapter. The short-run supply curve shows the level of real GDP produced at different possible price levels during a time period in which nominal incomes do not change in response to changes in the price level. Recall from the chapter on inflation that

$$\text{Real income} = \frac{\text{nominal income}}{\text{CPI (as decimal)}}$$

As explained by this formula, a rise in the price level measured by the CPI decreases real income, and a fall in the price level increases real income. Given the definition of the short-run aggregate supply curve, there are two reasons why one can assume nominal wages and salaries remain fixed in spite of changes in the price level:

1. **Incomplete knowledge.** In a short period of time, workers may be unaware that a change in the price level has changed their real incomes. Consequently, they
do not adjust their wage and salary demands according to changes in their real incomes.

2. **Fixed-wage contracts.** Unionized employees, for example, have nominal or money wages stated in their contracts. Also, many professionals receive set salaries for a year. In these cases, nominal incomes remain constant, or “sticky,” for a given time period regardless of changes in the price level.

The assumption that changes in the prices of goods and services measured by the CPI do not in a short period of time cause changes in nominal wages, let’s examine Exhibit A-1(a) and explain the SRAS curve’s upward-sloping shape. Begin at point A with a CPI of 100 and observe that the economy is operating at the full-employment real GDP of $8 trillion. Also, assume that labor contracts are based on this expected price level. Now suppose the price level unexpectedly increases from 100 to 150 at point B. At higher prices for products, firms’ revenues increase, and with nominal wages and salaries fixed, profits rise. In response, firms increase output from $8 trillion to $12 trillion, and the economy operates beyond
its full-employment output. This occurs because firms increase work hours and train and hire homemakers, retirees, and unemployed workers who were not profitable at or below full-employment real GDP.

Now return to point A and assume the CPI falls to 50 at point C. In this case, the prices firms receive for their products drop while nominal wages and salaries remain fixed. As a result, firms’ revenues and profits fall, and they reduce output from $8 trillion to $4 trillion real GDP. Correspondingly, employment (not shown explicitly in the model) falls below full employment.

**CONCLUSION** The upward-sloping shape of the short-run aggregate supply curve (SRAS) is the result of fixed nominal wages and salaries as the price level changes.

### Why the Long-Run Aggregate Supply Curve is Vertical

The long-run aggregate supply curve (LRAS) is presented in Exhibit A-1(b). The long-run aggregate supply curve shows the level of real GDP produced at different possible price levels during a time period in which nominal incomes change by the same percentage as the price level changes. Like the classical vertical segment of the aggregate supply curve developed in Exhibit 6 of the chapter, the long-run aggregate supply curve is vertical at full-employment real GDP.

To understand why the long-run aggregate supply curve is vertical requires the assumption that sufficient time has elapsed for labor contracts to expire, so that nominal wages and salaries can be renegotiated. Stated another way, over a long enough time, workers will calculate changes in their real incomes and obtain increases in their nominal incomes to adjust proportionately to changes in purchasing power. Suppose the CPI is 100 (or in decimal, 1.0) at point A in Exhibit A-1(b) and the average nominal wage is $10 per hour. This means the average real wage is also $10 ($10 nominal wage divided by 1.0). But if the CPI rises to 150 at point B, the $10 average real wage falls to $6.67 ($10/1.5). In the long run, workers will demand and receive a new nominal wage of $15, returning their real wage to $10 ($15/1.5). Thus, both the CPI (rise from 100 to 150) and the nominal wage (rise from $10 to $15) changed by the same rate of 50 percent, and the economy moved from point A to point B, upward along the long-run aggregate supply curve. Note that because both the prices of products measured by the CPI and the nominal wage rise by the same percentage, profit margins remain unchanged in real terms, and firms have no incentive to produce either more or less than the full-employment real GDP of $8 trillion. And because this same adjustment process occurs between any two price levels along LRAS, the curve is vertical, and potential real GDP is independent of the price level. Regardless of rises or falls in the CPI, potential real GDP remains the same.

**CONCLUSION** The vertical shape of the long-run aggregate supply curve (LRAS) is the result of nominal wages and salaries eventually changing by the same percentage as the price level changes.
Equilibrium in the Self-Correcting AD-AS Model

Exhibit A-2 combines aggregate demand with the short-run and long-run aggregate supply curves from the previous exhibit to form the self-correcting AD-AS model. Equilibrium in the model occurs at point $E$, where the economy’s aggregate demand curve ($AD$), $SRAS$, and the long-run aggregate supply curve ($LRAS$) intersect. In long-run equilibrium, the economy’s price level is 100, and full-employment real GDP is $8$ trillion.

The Impact of an Increase in Aggregate Demand

Now you’re ready for some actions and reactions using the model. Suppose that, beginning at point $E_1$ in Exhibit A-3, a change in a nonprice determinant (summarized in Exhibit 11 at the end of the chapter) causes an increase in aggregate demand from $AD_1$ to $AD_2$. For example, the shift could be the result of an increase in consumption spending ($C$), government spending ($G$), or business investment ($I$), or greater demand for U.S. exports. Regardless of the cause, the short-run effect is for the economy to move upward along $SRAS_{100}$ to the intersection with $AD_2$ at the temporary or short-run equilibrium point $E_2$ with a price level of 150. Recall that nominal incomes...
Exhibit A-3  Adjustments to an Increase in Aggregate Demand

Beginning at long-run equilibrium $E_1$, the aggregate demand curve increases from $AD_1$ to $AD_2$. Since nominal incomes are fixed in the short run, firms raise product prices, earn higher profits, and expand output to short-run equilibrium point $E_2$. After enough time passes, workers increase their nominal incomes to restore their purchasing power, and the short-run supply curve shifts leftward along $AD_2$ to a transitional point such as $E_3$. As the economy moves from $E_2$ to $E_4$, profits fall, and firms cut output and employment. Eventually, long-run equilibrium is reached at $E_4$ with full employment restored by the self-correction process.

<table>
<thead>
<tr>
<th></th>
<th>Price level (CPI)</th>
<th>Real GDP (trillions of dollars per year)</th>
</tr>
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<tbody>
<tr>
<td>$E_1$</td>
<td></td>
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<tr>
<td>$E_2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$E_3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$E_4$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CAUSATION CHAIN**

1. Increase in aggregate demand
2. Increase in price level and real GDP
3. Nominal incomes rise
4. SRAS shifts leftward
5. Long-run equilibrium restored

are fixed in the short run. Faced with higher demand, firms raise prices for products and, because the price of labor remains unchanged, firms earn higher profits and increase employment by hiring workers who were not profitable at full employment. As a result, for a short period of time, real GDP increases above the full-employment real GDP of $8 trillion to $12 trillion. However, the economy cannot produce in excess of full employment forever. What forces are at work to bring real GDP back to full-employment real GDP?
Assume time passes and labor contracts expire. The next step in the transition process at $E_1$ is that workers begin demanding nominal income increases that will eventually bring their real incomes back to the same real incomes established initially at $E_1$. Since firms are anxious to maintain their output levels, and they are competing for workers, firms meet the wage increase demands of labor. These increases in nominal incomes shift the short-run aggregate supply curve leftward, which causes an upward movement along $AD_2$. One of the successions of possible intermediate adjustment short-run supply curves along $AD_2$ is $SRAS_{150}$. This short-run intermediate adjustment is based on an expected price level of 150 determined by the intersection of $SRAS_{150}$ and $LRAS$. Although the short-run aggregate supply curve $SRAS_{150}$ intersects $AD_2$ at $E_3$, the adjustment to the increase in aggregate demand is not yet complete. Workers negotiated increases in nominal incomes based on an expected price level of 150, but the leftward shift of the short-run aggregate supply curve raised the price level to about 175 at $E_3$. Workers must, therefore, negotiate another round of higher nominal incomes to restore purchasing power. This process continues until long-run equilibrium is restored at $E_4$, where the adjustment process ends.

The long-run forecast for the price level at full employment is now 200 at point $E_4$. $SRAS_{100}$ has shifted leftward to $SRAS_{200}$, which intersects $LRAS$ at point $E_4$. As a result of the shift in the short-run aggregate supply curve from $E_2$ to $E_4$, and the corresponding increase in nominal incomes, firms’ profits are cut, and they react by raising product prices, reducing employment, and reducing output. At $E_4$, the economy has self-adjusted to both short-run and long-run equilibrium at a price level of 200 and full-employment real GDP of $8$ trillion. If there are no further shifts in aggregate demand, the economy will remain at $E_4$ indefinitely. Note that nominal income is higher at point $E_4$ than it was originally at point $E_1$, but real wages and salaries remain unchanged, as explained in Exhibit A-1(b).

**Conclusion** An increase in aggregate demand in the long run causes the short-run aggregate supply curve to shift leftward because nominal incomes rise and the economy self-corrects to a higher price level at full-employment real GDP.

**The Impact of a Decrease in Aggregate Demand**

Point $E_1$ in Exhibit A-4 begins where the sequence of events described in the previous section ends. Now, let’s see what happens when the aggregate demand curve decreases from $AD_1$ to $AD_2$. The reason might be that a wave of pessimism from a stock market crash causes consumers to cut back on their spending and firms postpone buying new factories and equipment. As a result, firms find their sales and profits have declined, and they react by cutting product prices, output, and employment. Workers’ nominal incomes remain fixed in the short run with contracts negotiated based on an expected price level of 200. The result of this situation is that the economy moves downward along $SRAS_{200}$ from point $E_1$ to short-run equilibrium point $E_2$. Here, the price level falls from 200 to 150, and real GDP has fallen from $8$ trillion to $4$ trillion.

At $E_2$, the economy is in a serious recession, and after, say, a year, workers will accept lower nominal wages and salaries when their contracts are renewed in order to keep their jobs in a time of poor profits and competition from unemployed workers. This willingness to accept lower nominal incomes is made easier by the realization that lower prices for goods means it costs less to maintain the workers’ standard of
Assume the economy is initially at long-run equilibrium point $E_1$ and aggregate demand decreases from $AD_1$ to $AD_2$. Nominal incomes in the short run are fixed based on an expected price level of 200. In response to the fall in aggregate demand, firms' profits decline, and they cut output and employment. As a result, the economy moves downward along $SRAS_{200}$ to temporary equilibrium at $E_2$. When workers lower their nominal incomes because of competition from unemployed workers, the short-run aggregate supply curve shifts downward to an intermediate point, such as $E_3$. As workers decrease their nominal incomes based on the new long-run expected price level of 150 at point $E_3$, profits rise, and firms increase output and employment. In the long run, the short-run aggregate supply curve continues to automatically adjust downward along $AD_2$ until it again returns to long-run equilibrium at $E_4$. 

**Exhibit A-4**  
Adjustments to a Decrease in Aggregate Demand
living. As workers make a series of downward adjustments in nominal incomes, the short-run aggregate supply curve moves downward along $AD_2$ toward $E_4$. $SRAS_{150}$ illustrates one possible intermediate position corresponding to the long-run expected price level of 150 determined by the intersection of $SRAS_{150}$ and $LRAS$. However, like $E_2$, $E_3$ is not the point of long-run equilibrium. Workers negotiated decreases in nominal incomes based on an expected price level of 150, but the rightward shift of the short-run aggregate supply curve has lowered the price level to about 125 at $E_3$. Under pressure from unemployed workers who will work for still lower real wages and salaries, workers will continue this process of adjusting their nominal incomes lower until $SRAS_{150}$ shifts rightward to point $E_4$.

Eventually, the long-run expected full-employment price level returns to 100 at point $E_4$ where the economy has self-corrected to long-run full-employment equilibrium. The result of this adjustment downward along $AD_2$ between $E_2$ and $E_4$ is that lower nominal incomes raise profits and firms respond by lowering prices of products, increasing employment, and increasing output so that real GDP increases from $4$ trillion to $8$ trillion. Unless aggregate demand changes, the economy will be stable at $E_4$ indefinitely. Finally, observe that average nominal income has decreased by the same percentage between points $E_1$ and $E_4$ as the percentage decline in the price level. Therefore, real incomes are unaffected as explained in Exhibit A-1(b).

**CONCLUSION** A decrease in aggregate demand in the long run causes the short-run aggregate supply curve to shift rightward because nominal incomes fall and the economy self-corrects to a lower price level at full-employment real GDP.

**Changes in Potential Real GDP**

Like the aggregate demand and short-run aggregate supply curves, the long-run aggregate supply curve also changes. As explained in Chapter 2, changes in resources and technology shift the production possibilities curve outward. We now extend this concept of economic growth to the long-run aggregate supply curve as follows:

1. **Changes in resources:** For example, the quantity of land can be increased by reclaiming land from the sea or revitalizing soil. Over time, potential real GDP increases if the full-employment number of workers increases, holding capital and technology constant. Such growth in the labor force can result from population growth. Greater quantities of plants, production lines, computers, and other forms of capital also produce increases in potential real GDP. Capital includes **human capital**, which is the accumulation of education, training, experience, and health of workers.

2. **An advance in technology:** Technological change enables firms to produce more goods from any given amount of inputs. Even with fixed quantities of labor and capital, the latest computer-age machinery increases potential GDP.

**CONCLUSION** A rightward shift of the long-run aggregate supply curve represents economic growth in potential full-employment real GDP.
Over time, the U.S. economy typically adds resources and improves technology, and growth occurs in full-employment output. Exhibit A-5 uses basic aggregate demand and supply analysis to explain a hypothetical trend in the price level measured by the CPI between the years 2005, 2010, and 2015. The trend line connects the macro equilibrium points for each year. The following section uses real-world data to illustrate changes in the long-run aggregate supply curve over time.

### Increase in the Aggregate Demand and Long-Run Aggregate Supply Curves

The self-correcting AD-AS model shown in Exhibit A-5 revisits Exhibit 13 in the chapter, which illustrated economic growth that occurred between 1995 and 2000 in the U.S. economy. Exhibit A-6, however, uses short-run and long-run aggregate supply curves to expand the analysis. (For simplicity, the real GDP amounts have been rounded.) In 1995, the economy operated at point $E_1$, with the CPI at 152 and a real GDP of $8.0$ trillion. Since $LRAS_{95}$ at $E_1$ was estimated to be $8.3$ trillion real GDP, the economy was operating below its full-employment potential with an unemployment rate of 5.6 percent (not explicitly shown in the model). Over the next five years, the U.S. economy moved to full employment at point $E_3$ in 2000 and experienced growth in real GDP from $8.0$ trillion to $9.8$ trillion.
The CPI increased from 152 to 175 (mild inflation), and the unemployment rate fell to 4.0 percent.

During this time period, extraordinary technological change and capital accumulation, particularly in high-tech industries, caused economic growth in potential real GDP, represented by the rightward shift in the vertical long-run supply curve from \( LRAS_{95} \) to \( LRAS_{00} \). The movement from \( E_1 \) to point \( E_2 \). Nominal or money incomes of workers increased, and \( SRAS_{95} \) shifted leftward to \( SRAS_{00} \), establishing long-run full-employment equilibrium at \( E_3 \) on long-run aggregate supply curve \( LRAS_{00} \). Technological changes and capital accumulation over these years caused the rightward shift from \( LRAS_{95} \) to \( LRAS_{00} \), and potential real GDP grew from $8.3 trillion to $9.8 trillion.
Key Concepts

Short-run aggregate supply curve (SRAS)  Long-run aggregate supply curve (LRAS)

Summary

- The upward-sloping shape of the short-run aggregate supply curve (SRAS) is the result of fixed nominal wages and salaries as the price level changes.
- The vertical shape of the long-run aggregate supply curve (LRAS) is the result of nominal wages and salaries eventually changing by the same percentage as the price level changes.
- An increase in aggregate demand (AD) in the long run causes the short-run aggregate supply curve (SRAS) to shift leftward because nominal incomes rise and the economy self-corrects to a higher price level at full-employment real GDP.
- A decrease in aggregate demand in the long run causes the short-run aggregate supply curve (SRAS) to shift rightward because nominal incomes fall and the economy self-corrects to a lower price level at full-employment real GDP.
- Economic growth in potential real GDP is represented by a rightward shift in the long-run aggregate supply curve (LRAS). Shifts in LRAS are caused by changes in resources and advances in technology.

Study Questions and Problems

1. The economy of Tuckerland has the following aggregate demand and supply schedules, reflecting real GDP in trillions of dollars:

<table>
<thead>
<tr>
<th>Price level (CPI)</th>
<th>Aggregate demand</th>
<th>Short-run aggregate supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>150</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Graph the aggregate demand curve and the short-run aggregate supply curve.
b. What are short-run equilibrium real GDP and the price level?
c. If Tuckerland’s potential real GDP is $12 trillion, plot the long-run aggregate supply curve (LRAS) in the graph.

2. Using the graph from question 1 and assuming long-run equilibrium at $12 trillion, explain the impact of a 10 percent increase in workers’ income.

3. Use the graph drawn in question 1 and assume the initial equilibrium is $E_1$. Next, assume aggregate demand increases by $4 trillion. Draw the effect on short-run equilibrium.

4. Based on the assumptions of question 3, explain verbally the impact of an increase of $4 trillion in aggregate demand on short-run equilibrium.

5. The economy shown in Exhibit A-7 is initially in equilibrium at point $E_1$, and the aggregate demand curve decreases from $AD_1$ to $AD_2$. Explain the long-run adjustment process.
6. In the first quarter of 2001, real GDP was $9.88 trillion, and the price level measured by the GDP chain price index was 101. Real GDP was approximately equal to potential GDP. In the third quarter, aggregate demand decreased to $9.83 trillion, and the price level rose to 103. Draw a graph of this recession.

For Online Exercises, go to the Tucker Web site at www.cengage.com/economics/tucker.

Practice Quiz

For an explanation of the correct answers, visit the Trucker Web site at www.cengage.com/economics/tucker.

1. An assumption for the short-run aggregate supply curve is that it is a period of time in which
   a. knowledge is complete.
   b. wages are fixed.
   c. wages are constant for under one year.
   d. prices firms charge for products are fixed.

2. The long-run aggregate supply curve is based on the assumption that
   a. both the price level and nominal incomes are fixed.
   b. prices are flexible after one year.
   c. both the price level and nominal incomes change by the same percentage.
   d. potential GDP is undetermined.

3. Graphically, long-run macro equilibrium occurs at the
   a. midpoint of the aggregate demand curve.
   b. intersection of the aggregate demand and long-run aggregate supply curves regardless of the short-run aggregate supply curve.
   c. midpoint of the long-run aggregate supply curve.
   d. intersection of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves.

4. An increase in nominal incomes of workers results in the
   a. aggregate demand curve shifting to the left.
   b. long-run aggregate supply curve shifting to the right.
Practice Quiz Continued

c. short-run aggregate supply curve shifting to the left.
d. short-run aggregate supply curve shifting to the right.

5. An increase in aggregate demand in the long run will result in ____ in full-employment real GDP and ____ in the price level.
   a. no change; an increase
   b. an increase; no change
   c. a decrease; no change
   d. no change; a decrease

7. In Exhibit A-8, the intersection of \( AD_2 \) with \( SRAS \) indicates
   a. short-run equilibrium.
   b. long-run equilibrium.
   c. that the economy is operating at full employment.
   d. that prices and wages are inflexible.

8. In Exhibit A-8, the self-correcting AD-AS model argument is that competition
   a. from unemployed workers causes an increase in nominal wages and a rightward shift in \( SRAS \).
   b. from unemployed workers causes a rightward shift in \( LRAS \).
   c. among firms for workers increases nominal wages, and this causes a leftward shift in \( SRAS \).
   d. among consumers causes an increase in the CPI and a rightward shift in \( SRAS \).

9. In Exhibit A-8, the self-correcting AD-AS model theory is that in the long run the economy will
   a. remain where \( SRAS \) intersects \( AD_1 \).
   b. shift to the intersection of \( AD_2 \) and \( SRAS \).
   c. shift to the intersection of \( AD_2 \) and \( LRAS \).
   d. shift to the intersection of \( AD_2 \) and a new leftward-shifted \( SRAS \).

10. In Exhibit A-8, the self-correcting AD-AS model predicts that the long-run result of the decrease from \( AD_1 \) to \( AD_2 \) will be a (an)
    a. higher price level and higher unemployment rate.
    b. lower price level and higher unemployment rate.
    c. unchanged price level and full employment.
    d. lower price level and full employment.

11. Which of the following is most likely to cause a leftward shift in the long-run aggregate supply curve?
    a. An increase in labor
    b. An increase in capital
    c. An advance in technology
    d. Destruction of resources
12. As shown in Exhibit A-9, and assuming the aggregate demand curve shifts from $AD_1$ to $AD_2$, the full-employment level of real GDP is
   a. $12$ billion.
   b. $8$ billion.
   c. $150$ billion.
   d. unable to be determined.

13. Given the shift of the aggregate demand curve from $AD_1$ to $AD_2$ in Exhibit A-9, the real GDP and price level (CPI) in long-run equilibrium will be
   a. $8$ billion and $150$.
   b. $12$ billion and $200$.
   c. $8$ billion and $250$.
   d. $8$ billion and $200$.

14. Beginning from long-run equilibrium at point $E_1$ in Exhibit A-9, the aggregate demand curve shifts to $AD_2$. The real GDP and price level (CPI) in short-run equilibrium will be
   a. $12$ billion and $200$.
   b. $8$ billion and $250$.
   c. $8$ billion and $150$.
   d. $12$ billion and $250$.

15. Beginning from short-run equilibrium at point $E_2$ in Exhibit A-9, the economy’s movement to a new position of long-run equilibrium would best be described as
   a. a movement along the $AD_2$ curve with a shift in the $SRAS_1$ curve.
   b. a movement along the $SRAS_2$ curve with a shift in the $AD_2$ curve.
   c. a shift in the $LRAS$ curve to an intersection at $E_1$.
   d. no shift of any kind.