

INTERNATIONAL EDITION

SEVENTEENTH EDITION

EC NOMICS



SAMUELSON  NORDHAUS



ECONOMICS

Seventeenth Edition

PAUL A. SAMUELSON

Institute Professor Emeritus
Massachusetts Institute of Technology

WILLIAM D. NORDHAUS

A. Whitney Griswold Professor of Economics
Yale University



**McGraw-Hill
Irwin**

Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco St. Louis
Bangkok Bogotá Caracas Kuala Lumpur Lisbon London Madrid Mexico City
Milan Montreal New Delhi Santiago Seoul Singapore Sydney Taipei Toronto



ECONOMICS

Published by McGraw-Hill, an imprint of The McGraw-Hill Companies, Inc. 1221 Avenue of the Americas, New York, NY, 10020. Copyright © 2001, 1998, 1995, 1992, 1989, 1985, 1980, 1976, 1973, 1970, 1967, 1964, 1961, 1958, 1955, 1951, 1948, by The McGraw-Hill Companies, Inc. All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written consent of The McGraw-Hill Companies, Inc., including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning. Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

domestic 1 2 3 4 5 6 7 8 9 0 VN/VN 0 9 8 7 6 5 4 3 2 1 0
international 1 2 3 4 5 6 7 8 9 0 VN/VN 0 9 8 7 6 5 4 3 2 1 0

ISBN 0072314885

Vice president/Editor-in-chief: *Michael W. Junior*

Executive editor: *Lucille Sutton*

Marketing manager: *Marty W. Quinn*

Senior project manager: *Mary Conzachi*

Production supervisor: *Debra R. Sylvester*

Designer: *Amy Feldman*

Senior supplement coordinator: *Becky Szura*

Media technology producer: *Adelaide A. Rogula*

Cover design: *Amy Feldman*

Cover image: *3D Spherical Jigsaw Puzzle™ World Globe made in USA by Buffalo Games, Inc.*

Compositor: *York Graphics Services, Inc.*

Typeface: *10/12 New Baskerville*

Printer: *Von Hoffmann Press, Inc.*

Library of Congress Cataloging-in-Publication Data

Samuelson, Paul Anthony, 1915-

Economics / Paul A. Samuelson, William D. Nordhaus.—17th ed.
p. cm.

Includes index.

ISBN 0-07-231488-5 (alk. paper)

1. Economics. I. Nordhaus, William D. II. Title.

HB171.5 .S25 2001

330—dc21

00-062471

INTERNATIONAL EDITION ISBN 0071180648

Copyright © 2001. Exclusive rights by The McGraw-Hill Companies, Inc. for manufacture and export.

This book cannot be re-exported from the country to which it is sold by McGraw-Hill.

The International Edition is not available in North America.

Preface

As humanity welcomes the new century, economics as a science and as a subject continues to be central to concerns around the globe. The twentieth century witnessed a spectacular change in the living standards of most of the world, particularly those in the affluent countries of North America, Western Europe, and East Asia. While the first half of the century was marked by two world wars and one great depression, the last half has been one of virtually uninterrupted growth of living standards and the spread of free markets, democracy, and personal freedoms to many corners of the globe. The central question for the years ahead is, "Will the good fortune spread from the affluent minority to the poor majority?"

Fifty Years of Economics

Over the past two decades, there have been dramatic changes in both attitudes and in economic institutions. Dozens of countries have rejected socialist and collectivist approaches and adopted market systems. Strong economic growth has been experienced in countries as diverse as Ireland, Botswana, and the Philippines. At no time in recorded history have so many enjoyed such a sustained period of economic growth as they have during the Great Peace of the past half century.

You might think that prosperity would lead to a declining interest in economic affairs, but paradoxically an understanding of the enduring truths of economics has become even more vital in the affairs of people and nations. The United States grappled with slow growth in living standards and large government budget deficits; but by the turn of the century budget deficits had turned to surpluses, productivity growth turned up, and real incomes were increasing at a healthy pace.

In the larger scene, the world has become increasingly interconnected as computers and communications create an ever-more-competitive global marketplace. Developing countries and countries like Russia and Poland, all of which are trying to develop the institutions of mature capitalism, need a firm understanding of the institutions of a market economy if they are to attain the living standards of the affluent. At the same time, there is growing concern about international environmental problems and the need to forge agreements to preserve our

precious natural heritage. All these fascinating changes are part of the modern drama that we call economics.

Fifty Years of ECONOMICS

For more than half a century, this book has served as the standard bearer for the teaching of introductory economics in classrooms in America and throughout the world. Each new edition has distilled the best thinking of economists about how markets function and about what society can do to improve people's living standards. But economics has changed profoundly since the first edition of this text appeared in 1948. And because economics is above all a living and evolving organism, the need to keep *Economics* at the frontier in the rapidly evolving world economy affords the authors an exciting opportunity to present the latest thinking of modern economists and to show how the subject can contribute to a more prosperous world.

Our task then is this: We want to present a clear, accurate, and interesting introduction to the principles of modern economics and to the institutions of the American and world economies. Our primary goal is to survey economics, and in doing this we emphasize the basic economic principle that will endure beyond today's headlines.

THE SEVENTEENTH EDITION

Economics is a dynamic science—changing to reflect the shifting trends in economic affairs, in the environment, in the world economy, and in society at large. As economics and the world around it evolve, so does this book. These nine features differentiate this edition from other books:

1. The Core Truths of Economics. Often, economics appear to be an endless procession of new puzzles, problems, and difficult dilemmas. But as experienced teachers have learned, there are a few basic concepts that underpin all of economics. Once these basic concepts have been mastered, learning is much quicker and more enjoyable. *We have therefore chosen to focus on the central core of economics—on those enduring truths that will be just as important in the twenty-first century as they were in the twentieth.* Microeconomic concepts such as scarcity, efficiency, the gains from specialization, and the principle of comparative

advantage will be crucial concepts as long as scarcity itself exists. Moreover, students of macroeconomics must receive a firm grounding in the concepts of aggregate supply and demand and must understand the role of national and international monies. Students will learn the widely accepted theory of economic growth, but they should also understand the controversial theories of the business cycle.

2. Innovation in the Economy. One of the striking features of the modern economy is the rapidity of innovations in virtually every sector. We are accustomed to the dizzying speed of invention in computers, where new products and software appear monthly. The Internet is revolutionizing communications and making inroads into commerce. Nowhere in recorded history do we find such a rapid rate of improvement as has been seen for computers over the past three decades. But other sectors are also witnessing rapid innovation—we run in athletic equipment made of miraculous new materials and relax while listening to music from crystal-clear audio equipment. Our understanding of economic trends and policies must reflect this rapid change in our societies.

Economics is increasingly attentive to rapid innovation. In macroeconomics, new growth theories emphasize the importance of technology, invention, and human capital in the growth process. In microeconomics, we have included a new section on the economics of information, showing how externalities in the production of information and new technologies lead to market failures. And a case study of the economics of the Internet explores the dilemmas of pricing information.

3. Innovation in Economics. In addition, we emphasize innovations in economics itself. Economists are tinkerers, innovators, and inventors in their own way. History shows that economic ideas can produce tidal waves when they are applied to real-world problems. Among the important innovations studied here is the application of economics to our environmental problems through “emissions trading” plans. Other important economic innovations discussed are improved regulatory mechanisms and the radical new step of European monetary unification. One of the most influential economic innovations of the last few years involves the measurement of consumer

prices. We introduce the important notion of “network economics” and show how it affects economic efficiency and market power, and how it has entered into the debate about breaking up Microsoft. One of the most important innovations for our common future is dealing with global public goods like climate change, and we analyze new approaches to dealing with international environmental problems such as the Kyoto Protocol.

4. Small Is Beautiful. Economics has increased its scope greatly over the past half-century. The flag of economics flies over its traditional territory of the marketplace, but it also covers the environment, legal studies, statistical and historical methods, art, gender and racial discrimination, and even family life. But at its core, economics is the science of choice, which means that we as authors, have to choose the most important and enduring issues for this text. In a survey, as in a meal, small is beautiful because it is digestible.

Choosing the subjects for this text required many hard choices. To select these topics, we continually survey teachers and leading scholars to determine the ones most crucial for an informed citizenry and a new generation of economists. We drew up a list of key ideas and bid adieu to many appendices and sections. *At every stage, we asked whether the material was, as best we could judge, necessary for a student's understanding of the economics of the twenty-first century.* Only when a subject passed this test was it included. The result of this campaign is a book that has lost more than one-quarter of its weight in the last two editions. Farming, labor unions, and Marxian economics have been trimmed to make room for environmental economics, network economics, and real business cycles.

5. Policy Issues at Century's Dawn. Each generation of economists finds new challenges to contend with in the attempt to understand evolving economic policy problems. Two areas that have been at the forefront of economics in the past decade have received expanded treatment in the seventeenth edition. As human societies grow, they begin to overwhelm the environment and ecosystems of the natural world. Environmental economics, presented in Chapter 18, helps students understand the externalities associated with economic activity and then analyzes different approaches to making human economies compatible

with natural systems. A second important area is international economics. We have completely reorganized our treatment of international economics by integrating the theory of comparative advantage into the microeconomics sections while reorganizing and restructuring the macroeconomic sections. The new organization will allow students to get an appreciation of the global economy at an earlier stage in their studies.

6. The Incredible Shrinking Globe. A century ago, the leading military strategist of the age, Captain A. T. Mahan, declared in his important book *The Influence of Sea Power on History*, “Whether they will or no, Americans must now begin to look outward.” President William Jefferson Clinton echoed these words when he wrote about economic affairs, “There is simply no way to close our borders and return to the insular days. To try to do so would be an exercise in futility, doomed not only to fail but to lower living standards in the process.”

Americans are learning that no nation is an island. Immigration and international trade have profound effects on the goods that are available, the prices we pay, and the wages we earn. Labor economists have found that the surge of uneducated immigrants over the last two decades has been an important contributor to the declining real wages of unskilled workers. Development economists have found striking results regarding the impact of economic openness on economic growth. No complete understanding of modern economics is possible without a thorough grounding in the world economy. The seventeenth edition continues to increase the material devoted to international economics and the interaction between international trade and domestic economic events.

7. Advances in Modern Macroeconomics. One of the major obstacles to understanding modern economics is the proliferation of contesting schools of macroeconomics. Teachers often wonder how students can understand the subject when macroeconomists themselves are so divided. While many fret about the divisiveness of modern macroeconomics, we think it is a sign of health and prefer lively debate to complacent consensus.

The seventeenth edition analyzes all major schools of modern macroeconomics within the clear organizing synthesis of aggregate supply and de-

mand. We show how macroeconomics of the Keynesian, old and new classical, supply-side, and monetarist varieties can be understood as emphasizing different aspects of expectations, market clearing, and aggregate demand. Each school is clearly presented and compared with its competitors in a balanced and evenhanded way. For each, the empirical evidence is presented and evaluated. The major schools are presented in a chapter on “The Warring Schools of Macroeconomics.” But we also emphasize the importance of the *policy implications* of the different approaches. And we also have reorganized and integrated the open-economy issues into the core chapters.

Although much macroeconomic combat is devoted to arguing about the sources of the business cycle, one of the major recent developments in economics has been the resurgence of attention to the forces underlying long-run economic growth. Economists are increasingly examining the determinants of long-run economic growth, the slowdown and recent rebound in productivity growth, and the generation of innovation and new technological knowledge. Putting economic growth front and center is necessary if students are to understand modern debates about the role of government debt and deficits. The seventeenth edition reflects this revival by synthesizing growth theories and findings into the central section on macroeconomics. We include growth theory as an integral part of aggregate supply and potential output and have revised and moved the chapter on economic development to follow the material on economic growth theory.

8. Emphasis on History and Policy. Students study economics to understand the rapidly changing world around them. For this reason, economics is at its core an empirical science. It first aims to explain the world around us and then helps us devise economic policies, based on sound economic principles, that can enhance the living standards of people at home and abroad.

Drawing upon history, economic chronicles, and the experience of the authors, the seventeenth edition continues to emphasize the use of case studies and empirical evidence to illustrate economic theories. The dilemmas involved in combating poverty become real when we understand the 1996 welfare reforms or the problems of the current health-care

system. Our appreciation of macroeconomic analysis increases when we see government deficits in the 1980s lowered national saving and how the current budget surpluses are increasing national saving. Macroeconomics can help explain the American economic miracle of the late 1990s.

The microeconomic chapters draw upon case studies, economic history, business decisions, and real-world experience to illustrate the fundamental principles. Examples such as the network economics, the Microsoft antitrust case, the flat tax, and the Kyoto Protocol on global warming, the economics of addictive substances, the minimum-wage debate, trading pollution permits, and the history of stock markets help bring the theorems of microeconomics to life. Game theory becomes serious—and has striking implications—when applied to pollution or winner-take-all games.

This “hands-on” approach to economics allows students to understand better the relevance of economic analysis to real-world problems. The abstract notion of scarcity becomes concrete when we see its implications for whether we have a good job, a healthy environment, adequate health care, and a secure nest egg for our retirement.

9. Clarity. Although there are many new features in the seventeenth edition, the pole star for our pilgrimage in preparing this edition has been to present economics clearly and simply. Students enter the classroom with a wide range of backgrounds and with many preconceptions about the way the world works. Our role is not to change their values, but to help them to understand the enduring economic principles and then to be able to apply them to make the world a better place for them, their families, and their communities. Nothing aids understanding better than clear, simple exposition. We have labored over every page to improve this survey of introductory economics. We have received thousands of comments and suggestions from teachers and students and have incorporated their counsel in the seventeenth edition.

Optional Matter

Economics courses range from one-quarter surveys to year-long intensive honors courses. This textbook has been carefully designed to meet all situations. The more advanced materials have been put in separate appendices or specially designated sections. These will appeal to curious students and to students

in demanding courses that survey the entire discipline thoroughly. We have included advanced questions for discussion to test the mettle of the most dedicated student.

If yours is a fast-paced course, you will appreciate the careful layering of the more advanced material. Hard-pressed courses can skip the advanced sections, covering the core of economic analysis without losing the thread of the economic reasoning. This book will challenge the most advanced young scholar. Indeed, many of today’s leading economists have written to say they’ve relied upon *Economics* all along their pilgrimage to the Ph.D.

Format

The seventeenth edition employs a greatly expanded set of in-text logos and material to help illustrate the central topics. You will find three distinctive logos: warnings for the fledgling economist, examples of economics in action, and biographical material on the great economists of the past and present. But these central topics are not drifting off by themselves in unattached boxes. Rather, they are integrated right into the chapter so that students can read them without breaking their train of thought. Keep these logos in mind as you read through the text:



is a warning that students should pause to ensure that they understand a difficult or subtle point.



is an interesting example or application of the analysis, and often it represents one of the major innovations of modern economics.



presents biographies of important economic figures. Sometimes these are famous economists like Adam Smith, while at other times they are people who introduced economics into public policy.

New features in this edition include fresh end-of-chapter questions, with a special accent upon short problems that reinforce the major concepts surveyed in the chapter. Terms printed in bold type in the text mark the first occurrence and definition of the most important words that constitute the language of economics.

But these many changes have not altered one bit the central stylistic beacon that has guided *Economics* since the first edition: to use simple sentences, clear explanations, and concise tables and graphs.

For Those Who Prefer Macro First

Although, like the previous edition, this new edition has been designed to cover microeconomics first, many teachers continue to prefer beginning with macroeconomics. They may think that the beginning student finds macro more approachable and will more quickly develop a keen interest in economics when the issues of macroeconomics are encountered first. We have taught economics in both sequences and find both work well.

Whatever your philosophy, this text has been carefully designed for it. Instructors who deal with microeconomics first can move straight through the chapters. Those who wish to tackle macroeconomics first should skip from Part One directly to Part Five, knowing that the exposition and cross-references have been tailored with their needs in mind.

In addition, for those courses that do not cover the entire subject, the seventeenth edition is available in two paperback volumes, *Microeconomics* (Chapters 1 to 19 of the full text) and *Macroeconomics* (Chapters 1 to 3 and 20 to 34 of the full text).

Auxiliary Teaching and Study Aids

Students of this edition will benefit greatly from the *Study Guide*. This carefully designed supplement was prepared by Kathryn Nantz and Laurence Miners of Fairfield University who worked in close collaboration with us in our revision. When used alongside classroom discussions and when employed independently for self-study, the *Study Guide* has proved to be an impressive success. There is a full-text *Study Guide*, as well as micro and macro versions.

In addition, instructors will find both the *Instructor's Resource Manual* and the *Test Bank* useful for planning their courses and preparing multiple sets of test questions in both print and computerized formats. Moreover, McGraw-Hill/Irwin has designed a beautiful set of two-color overhead transparencies for presenting the tabular and graphical material in the classroom. The graphs and figures in this edition can also be viewed electronically as PowerPoint slides. The slides can be downloaded from our website (www.mhhe.com/economics/samuelson). The website also contains self-grading, practice quizzes, interactive diagrams of key graphs, and the websites suggested for further research found at the end of each chapter. These items can all be obtained by contacting your local McGraw-Hill/Irwin sales representative.

Economics in the Computer Age

The electronic age has revolutionized the way that scholars and students can access information. In economics, the information revolution allows us quick access to economic statistics and research. An important feature of the seventeenth edition is the section "Economics and the Internet," which appears just before Chapter 1. This little section provides a road map for the state of economics on the Information Superhighway.

In addition, each chapter has a new section at the end with suggestions for further reading and a set of websites that can be used to deepen student understanding or find data and case studies.

Students can also purchase *The Power of Macroeconomics* and *The Power of Microeconomics*, which contain lessons directly tied to this text. These programs are lively combinations of PowerPoints with audio designed to reinforce economics concepts. They allow students to move at their own pace and engage students with questions during the presentation. *The Power of Macroeconomics* and *The Power of Microeconomics* were developed by Peter Navarro at the University of California at Irvine, Graduate School of Management. A complete description of this supplement can be found at www.powerofeconomics.com.

Acknowledgments

This book has two authors but a multitude of collaborators. We are profoundly grateful to colleagues, reviewers, students, and McGraw-Hill's staff for contributing to the timely completion of the seventeenth edition of *Economics*. Colleagues at MIT, Yale, and elsewhere who graciously contributed their comments and suggestions include William C. Brainard, E. Cary Brown, John Geanakoplos, Robert J. Gordon, Lyle Gramely, Paul Joskow, Alfred Kahn, Richard Levin, Robert Litan, Barry Nalebuff, Merton J. Peck, Gustav Ranis, Herbert Scarf, Robert M. Solow, James Tobin, Janet Yellen, and Gary Yohe.

In addition, we have benefited from the tireless devotion of those whose experience in teaching elementary economics is embodied in this edition. We are particularly grateful to the reviewers of the seventeenth edition. They include:

John Brennan, *Ana Maria College*
Adhip Chaudhuri, *Georgetown University*
Stephen Erfle, *Dickinson College*

Margaret Fogarty, *Skidmore College*
 Richard Fox, *Madonna University*
 James Gale, *Michigan Technological University*
 Gypsy Gallardo, *Eckerd College*
 Steven Hackett, *Humboldt State University*
 Joyce Jacobsen, *Wesleyan University*
 Philip LeBel, *Montclair State University*
 Patrick Mann, *West Virginia University*
 Ibrahim M. Oweiss, *Georgetown University*
 John Rapczak, *Community College of Rhode Island*
 Virginia Shingleton, *Valparaiso University*
 Leanne Smith, *Massey University—New Zealand*
 Chaitram J. Talele, *Columbia State University*
 Richard Tiffin, *University of Durham*
 Michael Meng-Hua Ye, *St. Mary's College of Maryland*

Students at MIT, Yale, and other colleges and universities have served as an “invisible college.” They constantly challenge and test us, helping to make this edition less imperfect than its predecessor. Although they are too numerous to enumerate, their influence is woven through every chapter. The statistical and historical material was prepared and double-checked by Andrew Pearlman. Nancy King and Glena Ames provided help in word processing. Marnie Wiss and Grace Profatilov coordinated the editorial process at the authors’ end.

This project would have been impossible without the skilled team from McGraw-Hill who nurtured the book at every stage. We particularly would like to thank, in chronological order to their appearance on the scene, Economics Editor Lucille Sutton, Developmental Editor Shoshannah Flach, Project Manager Mary Conzachi, Production Manager Debra Sylvester, and Marketing Manager Martin Quinn. This group of skilled professionals turned a pile of diskettes and a mountain of paper into a finely polished work of art.

A WORD TO THE SOVEREIGN STUDENT

You have read in the history books of revolutions that shake civilizations to their roots—religious conflicts, wars for political liberation, struggles against colonialism and imperialism. A decade ago, economic revolutions in Eastern Europe, in the former Soviet

Union, in China, and elsewhere tore those societies apart. Young people battered down walls, overthrew established authority, and agitated for democracy and a market economy because of discontent with their centralized socialist governments.

Students like yourselves are marching, and even going to jail, to win the right to study radical ideas and learn from Western textbooks like this one in the hope that they may enjoy the freedom and economic prosperity of democratic market economies.

The Intellectual Marketplace

Just what is the market that students in repressed societies are agitating for? In the pages that follow, you will learn about the markets for stocks and bonds, Mexican pesos and European Euros, unskilled labor and highly trained neurosurgeons. You have probably read in the newspaper about the gross domestic product, the consumer price index, the stock market, and the unemployment rate. After you have completed a thorough study of the chapters in this textbook, you will know precisely what these words mean. Even more important, you will also understand the economic forces that influence and determine them.

There is also a marketplace of ideas, where contending schools of economists fashion their theories and try to persuade their scientific peers. You will find in the chapters that follow a fair and impartial review of the thinking of the intellectual giants of our profession—from the early economists like Adam Smith, David Ricardo, and Karl Marx to modern-day titans like John Maynard Keynes, Milton Friedman, and Robert Solow.

Skoal!

As you begin your journey into the land of markets, it would be understandable if you are somewhat anxious. But take heart. The fact is that we envy you, the beginning student, as you set out to explore the exciting world of economics for the first time. This is a thrill that, alas, you can experience only once in a lifetime. So, as you embark, we wish you bon voyage!

Paul A. Samuelson
 William D. Nordhaus

For the Student: Economics and the Internet

The Information Age is revolutionizing our lives. The impact on scholars and students has been particularly profound because it allows inexpensive and rapid access to vast quantities of information. The Internet, which is a huge and growing public network of linked computers and information, is changing the way we study, shop, share our culture, and communicate with our friends and family.

In economics, the Internet allows us quick access to economics statistics and research. With just a few clicks of a mouse, we can find out about the most recent unemployment rate, track down information on poverty and incomes, or investigate the intricacies of our banking system. A few years ago, it might have taken weeks to dig out the data necessary to analyze an economic problem. Today, with a computer and a little practice, that same task can be done in a few minutes.

This book is not a manual for driving on the Information Superhighway. That skill can be learned in classes on the subject or from informal tutorials. Rather, we want to provide a road map that shows the locations of economic data and research. With this map and some rudimentary navigational skills, you can explore the various sites and find a rich array of data, information, studies, and chat rooms.

This introduction provides an overview of the Internet and describes some of the most important websites in economics. Additionally, at the end of each chapter there is a list of useful websites that can be used to follow up the major themes of that chapter.

Note that some of these sites may be free, some may require a registration or be available through your college or university, and others may require paying a fee. Pricing practices change rapidly, so while we have attempted to include primarily free sites, we have not excluded high-quality sites that may charge during 2000.

Data and Institutions. The Internet is an indispensable source of useful data and other information. Since most economic data are provided by governments, the first place to look is the Web pages of government agencies and international organizations. The starting point for U.S. government statistics,

www.fedstats.gov, provides one-stop shopping for Federal statistics with links to over 70 government agencies that produce statistical information. Sources are organized by subject or by agency, and the contents are fully searchable. Another good launching site into the federal statistical system is the Economic Statistics Briefing Room at www.whitehouse.gov/fsbr/esbr.html. Additionally, the Commerce Department operates a huge database at www.stat-usa.gov, but use of parts of this database requires a subscription (which may be available at your college or university). A portal for government data in many sectors can be found at www.lib.umich.edu/libhome/Documents.center/stats.html.

The best single statistical source for data on the United States is *The Statistical Abstract of the United States*, published annually. It is available online at www.census.gov/statab/www. If you want an overview of the U.S. economy, you can read *The Economic Report of the President* at w3.access.gpo.gov/eop and www.whitehouse.gov/WH/EOP/CEA/html/index.html.

Most of the major economic data is produced by specialized agencies. One place to find general data is the Department of Commerce, which encompasses the Bureau of Economic Analysis (BEA) (www.bea.doc.gov) and the Census Bureau (www.census.gov). The BEA site includes all data and articles published in the *Survey of Current Business*, including the national income and product accounts, international trade and investment flows, output by industry, economic growth, personal income and labor series, and regional data.

The Census site goes well beyond a nose count of the population. It also includes the economic census as well as information on housing, income and poverty, government finance, agriculture, foreign trade, construction, manufacturing, transportation, and retail and wholesale trade. In addition to making Census publications available, the Census site allows users to create custom extracts of popular microdata sources including the Survey of Income and Program Participation, Consumer Expenditure Survey, Current Population Survey, American Housing Survey, and, of course, the most recent census.

The Bureau of Labor Statistics (at www.bls.gov) provides easy access to commonly requested labor data, including employment and unemployment, prices and living conditions, compensation, productivity, and technology. Also available are labor-force data from the Current Population Survey and payroll statistics from the Current Employment Statistics Survey.

A useful source for financial data is the website of the Federal Reserve Board at www.federalreserve.gov. This site provides historical U.S. economic and financial data, including daily interest rates, monetary and business indicators, exchange rates, balance-of-payments data, and price indices. In addition, the Office of Management and Budget at www.gpo.gov/usbudget/index.html makes available the federal budget and related documents.

International statistics are often harder to find. The World Bank at www.worldbank.org has information on its programs and publications at its site, as does the International Monetary Fund, or IMF at www.imf.org. The United Nations website (www.unsystem.org) is slow and confusing but has links to most international institutions and their databases. Another good source of information about high-income countries is the Organisation for Economic Cooperation and Development, or OECD at www.oecd.org. The OECD's website contains an array of data on economics, education, health, science and technology, agriculture, energy, public management, and other topics.

Economic Research and Journalism. The Internet is rapidly becoming the world's library. Newspapers, magazines, and scholarly publications are increasingly posting their writing in electronic form. Most of these present what is already available in the paper publications. Some interesting sources can be found at the *Economist* at www.economist.com and *The Financial Times* (www.ft.com). *The Wall Street Journal* at www.wsj.com is currently expensive and not a cost-effective resource. Current policy issues are discussed at www.policy.com. The online magazine *Slate* at www.slate.com occasionally contains excellent essays in economics.

For scholarly writings, many journals are making their contents available online. WebEc at

www.helsinki.fi/WebEc contains a listing of websites for many economic journals. The archives of many journals are available at www.jstor.org.

There are now a few websites that bring many resources together in one place. One place to start is *Resources for Economists on the Internet*, sponsored by the American Economic Association and edited by Bill Goffe at www.rfe.org. Also see *WWW Resources in Economics*, which has links to many different branches of economics at netec.wustl.edu/WebEc/WebEc.html. Another site with much entertaining and useful information is www.economics.miningco.com/finance/economics. These sites also offer a comprehensive list of links to economics journals. For working papers, the National Bureau of Economic Research (NBER) website at www.nber.org contains current economic research. The NBER site also contains general resources, including links to data sources and the official U.S. business-cycle dates.

An excellent site that archives and serves as a depository for working papers is located at econwpa.wustl.edu/wpawelcome.html. This site is particularly useful for finding background material for research papers.

Did someone tell you that economics is the dismal science? You can chuckle over economist jokes (mostly at the expense of economists) at www.netec.wustl.edu/JokEc.html.

A Word of Warning. Note that, because of rapid technological change, this list will soon be out of date. New sites with valuable information and data are appearing every day...and others are disappearing almost as rapidly.

Before you set off into the wonderful world of the Web, we would pass on to you some wisdom from experts. Remember the old adage, you only get what you pay for:

Warning: Be careful to determine that your sources and data are reliable. The Internet and other electronic media are easy to use and equally easy to abuse.

The Web is the closest thing in economics to a free lunch. But you must select your items carefully to ensure that they are palatable and digestible.

Contents in Brief

Preface	xvii
Economics and the Internet	xxiii

PART ONE	BASIC CONCEPTS	I
Chapter 1	The Fundamentals of Economics	3
Appendix 1	How to Read Graphs	18
Chapter 2	Markets and Government in a Modern Economy	25
Chapter 3	Basic Elements of Supply and Demand	46
PART TWO	MICROECONOMICS: SUPPLY, DEMAND, AND PRODUCT MARKETS	65
Chapter 4	Applications of Supply and Demand	67
Chapter 5	Demand and Consumer Behavior	85
Appendix 5	Geometrical Analysis of Consumer Equilibrium	102
Chapter 6	Production and Business Organization	108
Chapter 7	Analysis of Costs	125
Appendix 7	Production, Cost Theory, and Decisions of the Firm	142
Chapter 8	Analysis of Perfectly Competitive Markets	147
Chapter 9	Imperfect Competition and Its Polar Case of Monopoly	166
Chapter 10	Oligopoly and Monopolistic Competition	183
Chapter 11	Uncertainty and Game Theory	203
PART THREE	FACTOR MARKETS: LABOR, LAND, AND CAPITAL	223
Chapter 12	How Markets Determine Incomes	225
Chapter 13	The Labor Market	243
Chapter 14	Land and Capital	267
Appendix 14	Markets and Economic Efficiency	286

PART FOUR	APPLIED MICROECONOMICS: INTERNATIONAL TRADE, GOVERNMENT, AND THE ENVIRONMENT	295
Chapter 15	Comparative Advantage and Protectionism	297
Chapter 16	Government Taxation and Expenditure	322
Chapter 17	Promoting More Efficient Markets	344
Chapter 18	Protecting the Environment	363
Chapter 19	Efficiency vs. Equality: The Big Trade-off	385
PART FIVE	MACROECONOMICS: THE STUDY OF ECONOMIC GROWTH AND BUSINESS CYCLES	411
Chapter 20	Overview of Macroeconomics	413
Appendix 20	Macroeconomic Data	432
Chapter 21	Measuring Economic Activity	434
Chapter 22	Consumption and Investment	455
Chapter 23	Business Fluctuations and the Theory of Aggregate Demand	476
Chapter 24	The Multiplier Model	491
Chapter 25	Money, Banking, and Financial Markets	511
Chapter 26	Central Banking and Monetary Policy	541
PART SIX	ECONOMIC GROWTH AND MACROECONOMIC POLICY	565
Chapter 27	The Process of Economic Growth	567
Chapter 28	The Challenge of Economic Development	591
Chapter 29	Exchange Rates and the International Financial System	612
Chapter 30	Open-Economy Macroeconomics	635
PART SEVEN	UNEMPLOYMENT, INFLATION, AND ECONOMIC POLICY	659
Chapter 31	Unemployment and the Foundations of Aggregate Supply	661
Chapter 32	Ensuring Price Stability	683
Chapter 33	The Warring Schools of Macroeconomics	709
Chapter 34	Policies for Growth and Stability	730

Contents

Preface xvii

Economics and the Internet xxiii



PART ONE BASIC CONCEPTS I

Chapter 1 The Fundamentals of Economics 3

A. Introduction 3
For Whom the Bell Tolls • Scarcity and Efficiency: The Twin Themes of Economics 4 • Microeconomics and Macroeconomics • The Logic of Economics 5 • Cool Heads at the Service of Warm Hearts 6 •

B. The Three Problems of Economic Organization 7
Market, Command, and Mixed Economies 8 •

C. Society's Technological Possibilities 8
Inputs and Outputs 9 • The Production-Possibility Frontier 9 • Putting the PPF to Work • Opportunity Costs • Efficiency •

Summary 15 • Concepts for Review 15 • Further Reading and Internet Websites 16 • Questions for Discussion 16 •

Appendix I How to Read Graphs 18

The Production-Possibility Frontier 18 • Production-Possibility Graph • Slopes and Lines • Shifts of and Movement Along Curves • Some Special Graphs •

Summary 23 • Concepts for Review 24 • Questions for Discussion 24 •

Chapter 2 Markets and Government in a Modern Economy 25

A. What Is a Market? 26
Not Chaos, but Economic Order • How Markets Solve the Three Economic Problems • Monarchs of the Marketplace • A Picture of Prices and Markets • The Invisible Hand •

B. Trade, Money, and Capital 31
Trade, Specialization, and Division of Labor 31 • Money: The Lubricant of Exchange 33 • Capital 33 • Capital and Private Property •

C. The Economic Role of Government 35
Efficiency 36 • Imperfect Competition • Externalities • Public Goods • Equity 38 • Macroeconomic Growth and Stability 40 • Twilight of the Welfare State? 41 •

Summary 42 • Concepts for Review 43 • Further Reading and Internet Websites 44 • Questions for Discussion 44 •

Chapter 3 Basic Elements of Supply and Demand 46

A. The Demand Schedule 47
The Demand Curve 48 • Market Demand • Forces behind the Demand Curve • Shifts in Demand •

B. The Supply Schedule 52
The Supply Curve 52 • Forces behind the Supply Curve • Shifts in Supply •

C. Equilibrium of Supply and Demand 55
Equilibrium with Supply and Demand Curves 56 • Effect of a Shift in Supply or Demand • Interpreting Changes in Price and Quantity • Supply, Demand, and Immigration • Rationing by Prices 60 •

Summary 61 • Concepts for Review 62 • Further Reading and Internet Websites 62 • Questions for Discussion 62 •



PART TWO

MICROECONOMICS: SUPPLY, DEMAND, AND PRODUCT MARKETS

65

Chapter 4 Applications of Supply and Demand 67

A. Elasticity of Demand and Supply 67

Price Elasticity of Demand 68 • Calculating Elasticities • Price Elasticity in Diagrams • Elasticity and Revenue 72 • The Paradox of the Bumper Harvest • Price Elasticity of Supply 74 •

B. Applications to Major Economic Issues 75

The Economics of Agriculture 75 • Long-Run Relative Decline of Farming • Impact of a Tax on Price and Quantity 77 • Minimum Floors and Maximum Ceilings 79 • The Minimum-Wage Controversy • Energy Price Controls •

Summary 82 • Concepts for Review 83 • Further Reading and Internet Websites 83 • Questions for Discussion 83 •

Chapter 5 Demand and Consumer Behavior 85

Choice and Utility Theory 85 • Marginal Utility and the Law of Diminishing Marginal Utility • A Numerical Example • Equimarginal Principle: Equal Marginal Utilities per Dollar for Every Good 88 • Why Demand Curves Slope Downward • Leisure and the Optimal Allocation of Time • An Alternative Approach: Substitution Effect and Income Effect 90 • Substitution Effect • Income Effect • From Individual to Market Demand 91 • Demand Shifts • Substitutes and Complements • Empirical Estimates of Price and Income Elasticities • The Economics of Addiction 93 • The Paradox of Value 96 • Consumer Surplus 96 • Applications of Consumer Surplus •

Summary 98 • Concepts for Review 99 • Further Reading and Internet Websites 99 • Questions for Discussion 100 •

Appendix 5 Geometrical Analysis of Consumer Equilibrium 102

The Indifference Curve 102 • Law of Substitution • The Indifference Map • Budget Line or Budget Constraint 104 • The Equilibrium Position of Tangency 105 • Changes in Income and Price 105 • Income Change • Single Price Change • Deriving the Demand Curve 106 •

Summary to Appendix 107 • Concepts for Review 107 • Questions for Discussion 107 •

Chapter 6 Production and Business Organization 108

A. Theory of Production and Marginal Products 108

Basic Concepts 108 • The Production Function • Total, Average, and Marginal Product • The Law of Diminishing Returns • Returns to Scale 112 • Short Run and Long Run 113 • Technological Change 114 • Productivity and the Aggregate Production Function 116 • Productivity • Productivity Growth from Economies of Scale • Empirical Estimates of the Aggregate Production Function •

B. Business Organizations 118

The Nature of the Firm 118 • Big, Small, and Infinitesimal Businesses 119 • The Individual Proprietorship • The Partnership • The Corporation •

Summary 121 • Concepts for Review 122 • Further Reading and Internet Websites 123 • Questions for Discussion 123 •

Chapter 7 Analysis of Costs 125

A. Economic Analysis of Costs 125

Total Cost: Fixed and Variable 125 • Fixed Cost • Variable Cost • Definition of Marginal Cost 126 • Average Cost 128 • Average or Unit Cost • Average Fixed and Variable Cost • Minimum Average Cost • The Link between Production and Costs 131 • Diminishing Returns and U-Shaped Cost Curves • Choice of Inputs by the Firm 132 • Marginal Products and the Least-Cost Rule •

B. Economic Costs and Business Accounting 134

The Income Statement, or Statement of Profit and Loss 134 • The Balance Sheet 136 • Accounting Conventions •

C. Opportunity Costs 137

Opportunity Cost and Markets 138 •

Summary 139 • Concepts for Review 140 • Further Reading and Internet Websites 140 • Questions for Discussion 140 •

Appendix 7 Production, Cost Theory, and Decisions of the Firm 142

A Numerical Production Function 142 • The Law of Diminishing Marginal Product 142 • Least-Cost Factor Combination for a Given Output 143 • Equal-Product Curves • Equal-Cost Lines • Equal-Product and Equal-Cost Contours: Least-Cost Tangency • Least-Cost Conditions •

Summary to Appendix 145 • Concepts for Review 146 • Questions for Discussion 146 •

Chapter 8 Analysis of Perfectly Competitive Markets 147

A. Supply Behavior of the Competitive Firm 147
Behavior of a Competitive Firm 147 • Perfect Competition • Competitive Supply Where Marginal Cost Equals Price • Total Cost and the Shutdown Condition •

B. Supply Behavior in Competitive Industries 152
Summing All Firms' Supply Curves to Get Market Supply 152 • Short-Run and Long-Run Equilibrium 152 • The Long Run for a Competitive Industry •

C. Special Cases of Competitive Markets 155
General Rules 155 • Constant Cost • Increasing Costs and Diminishing Returns • Fixed Supply and Economic Rent • Backward-Bending Supply Curve • Shifts in Supply •

D. Efficiency and Equity of Competitive Markets 157
Evaluating the Market Mechanism 157 • The Concept of Efficiency • Efficiency of Competitive Equilibrium • Equilibrium with Many Consumers and Markets • The Central Role of Marginal-Cost Pricing • Qualifications 161 • Market Failures • Two Cheers for the Market, but Not Three •

Summary 162 • Concepts for Review 164 • Further Reading and Internet Websites 164 • Questions for Discussion 164 •

Chapter 9 Imperfect Competition and Its Polar Case of Monopoly 166

A. Patterns of Imperfect Competition 166
Definition of Imperfect Competition • Varieties of Imperfect Competitors 168 • Monopoly • Oligopoly • Monopolistic Competition • Sources of Market Imperfections 170 • Costs and Market Imperfection • Barriers to Entry •

B. Marginal Revenue and Monopoly 173
The Concept of Marginal Revenue 173 • Price, Quantity, and Total Revenue • Marginal Revenue and Price • Profit-Maximizing Conditions 176 • Monopoly Equilibrium in Graphs • Perfect Competition as a Polar Case of Imperfect Competition • The Marginal Principle: Let Bygones Be Bygones 179 •

Summary 181 • Concepts for Review 181 • Further Reading and Internet Websites 182 • Questions for Discussion 182 •

Chapter 10 Oligopoly and Monopolistic Competition 183

A. Behavior of Imperfect Competitors 183
Measures of Market Power • The Nature of Imperfect Competition 185 • Theories of Imperfect Competition 185 • Collusive Oligopoly • Monopolistic Competition • Rivalry among the Few • Game Theory • Price Discrimination 190 •

B. Innovation and Information 191
Behavior of Large Corporations 191 • Divorce of Ownership and Control • Information, Innovation, and Schumpeterian Economics 192 • The Economics of Information • Intellectual Property Rights • The Dilemma of the Internet • The Schumpeterian Hypothesis •

C. A Balance Sheet on Imperfect Competition 196
Economic Costs of Imperfect Competition 196 • The Cost of Inflated Prices and Insufficient Output • Measuring the Waste from Imperfect Competition • Intervention Strategies 198 •

Summary 199 • Concepts for Review 200 • Further Reading and Internet Websites 200 • Questions for Discussion 201 •

Chapter 11 Uncertainty and Game Theory 203

A. Economics of Risk and Uncertainty 204
Speculation: Shipping Assets or Goods across Space and Time 204 • Arbitrage and Geographic Price Patterns • Speculation and Price Behavior over Time • Shedding

Risks through Hedging • The Economic Impacts of Speculation • **Risk and Uncertainty 207** • **Insurance and Risk Spreading 209** • Capital Markets and Risk Sharing • **Market Failures in Information 210** • Moral Hazard and Adverse Selection • Social Insurance •

B. Game Theory 212

Thinking about Price Setting • **Basic Concepts 212** • Alternative Strategies • **Some Important Examples of Game Theory 215** • To Collude or Not to Collude • The Prisoner's Dilemma • The Pollution Game • Deadly Arms Races • Games, Games, Everywhere . . . •

Summary 220 • **Concepts for Review 221** • **Further Reading and Internet Websites 221** • **Questions for Discussion 221** •



PART THREE FACTOR MARKETS: LABOR, LAND, AND CAPITAL 223

Chapter 12 How Markets Determine Incomes 225

A. Income and Wealth 225

Income 226 • Factor Incomes vs. Personal Incomes • Role of Government • **Wealth 228** •

B. Input Pricing by Marginal Productivity 229

The Nature of Factor Demands 229 • Demands for Factors Are Derived Demands • Demands for Factors Are Interdependent • **Distribution Theory and Marginal Revenue Product 231** • Marginal Revenue Product • **The Demand for Factors of Production 232** • Factor Demands for Profit-Maximizing Firms • Marginal Revenue Product and the Demand for Factors • **Supply of Factors of Production 234** • **Determination of Factor Prices by Supply and Demand 234** • **The Distribution of National Income 237** • Marginal-Productivity Theory with Many Inputs • **An Invisible Hand for Incomes? 239** •

Summary 240 • **Concepts for Review 241** • **Further Reading and Internet Websites 241** • **Questions for Discussion 241** •

Chapter 13 The Labor Market 243

A. Fundamentals of Wage Determination 243

The General Wage Level 243 • Demand for Labor 244 • Marginal Productivity Differences • International

Comparisons • **The Supply of Labor 247** • Determinants of Supply • Empirical Findings • **Wage Differentials 248** • Differences in Jobs: Compensating Wage Differentials • Differences in People: Labor Quality • Differences in People: The "Rents" of Unique Individuals • Segmented Markets and Noncompeting Groups •

B. Economics of Labor Unions 254

History and Practice of Labor Unions 254 • Government and Collective Bargaining • **How Unions Raise Wages 255** • Theoretical Indeterminacy of Collective Bargaining • **Effects on Wages and Employment 256** • Has Unionization Raised Wages? • Effects on Employment • The Lump-of-Labor Fallacy •

C. Discrimination by Race and Gender 258

Discrimination 258 • Economic Explanations of **Discrimination 258** • Definition of Discrimination • Discrimination by Exclusion • Taste for Discrimination • Statistical Discrimination • **Economic Discrimination against Women 260** • **Empirical Evidence 261** • **Reducing Labor Market Discrimination 262** • Uneven Progress •

Summary 264 • **Concepts for Review 265** • **Further Reading and Internet Websites 265** • **Questions for Discussion 265** •

Chapter 14 Land and Capital 267

A. Land and Rent 267

Rent as Return to Fixed Factors • Taxing Land •

B. Capital and Interest 270

Basic Concepts 270 • Prices and Rentals on Capital Goods • Rate of Return on Capital Goods • Financial Assets vs. Tangible Assets • Financial Assets and Interest Rates • Real vs. Nominal Interest Rates • **Present Value of Assets 272** • Present Value for Perpetuities • General Formula for Present Value • Acting to Maximize Present Value • **Profits 274** • Reported Profit Statistics • Determinants of Profits • Review • **The Theory of Capital and Interest 276** • Roundaboutness • Diminishing Returns and the Demand for Capital • Determination of Interest and the Return on Capital • Graphical Analysis of the Return on Capital • **Applications of Classical Capital Theory 279** • Taxes and Inflation • Technological Disturbances • Uncertainty and Expectations • **Empirical Findings 280** • Returns on Different Assets • Returns to Labor and Capital • **Valedictory Thoughts on Factor Prices, Efficiency, and Distribution 282** •