

Economics

Eighteenth Edition



Samuelson
Nordhaus

MCGRAW-HILL INTERNATIONAL EDITION





ECONOMICS

Eighteenth Edition

PAUL A. SAMUELSON

Institute Professor Emeritus
Massachusetts Institute of Technology

WILLIAM D. NORDHAUS

Sterling Professor of Economics
Yale University



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

International Edition 2005

Exclusive rights by McGraw-Hill Education (Asia), 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.

Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. Copyright © 2005, 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 database 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.

10 09 08 07 06 05 04 03 02 01

20 09 08 07 06 05 04

CTF BJE

Library of Congress Control Number: 2004048113

When ordering this title, use ISBN 007-123932-4

Printed in Singapore

www.mhhe.com



Preface

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. People are asking, Will the twenty-first century repeat the successes of the last century? Will the affluence of the few spread to the many in poor countries? Or will the horsemen of the apocalypse—famine, war, and disease—continue to grip Africa and perhaps even spread more widely? To a large extent, the answers to these questions depend mainly on the economic successes of countries—in education, in investment, in foreign trade, and in health care.

The Growing Role of Markets

Over the past quarter-century, both attitudes and economic institutions have changed dramatically. 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 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; yet over the last decade productivity growth has rebounded so sharply that the nation has combined rapid output growth with declining employment.

In the larger scene, the world has become increasingly interconnected as computers and communications create an ever-more-competitive global marketplace. Developing countries like China, India, and Russia—three giants that relied heavily on central planning until recently—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.

ECONOMICS Reborn

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 distills 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, *Economics* is born anew each edition as the authors have the 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 principles that will endure beyond today's headlines.

THE EIGHTEENTH 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 seven features differentiate this edition from other books:

1. The Core Truths of Economics. Often, economics appears to be an endless procession of new puzzles, problems, and 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 Economics. Economics has made many advances in understanding the role of innovation. 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.

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 we survey 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 explain how behavioral economics has changed views of consumer theory. Network economics is explained, and we describe how it affects economic efficiency and market power and how it has entered into the debate about how to deal with Microsoft’s monopolistic behavior. One of the most important innovations for our common future is dealing with global public goods like climate change, and we analyze new ways to deal with international environmental problems, including approaches such as the Kyoto Protocol.

3. 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, must 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 issues most crucial for an informed citizenry and a new generation of economists. We drew up a list of key ideas and bid adieu to material we judged inessential or dated. *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 few editions. Farm economics, labor unions, Marxian economics, the lump-of-labor fallacy, and health economics have been trimmed to make room for environmental economics, network economics, real business cycles, and financial economics.

4. Policy Issues for the New Century. For many students, the lure of economics is its relevance to public policy. The eighteenth edition emphasizes policy in both microeconomics and macroeconomics. 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. New examples—such as dividend tax reform, the minimum wage, international outsourcing, the value of a brand, as well as problems of financial finagling—bring the core principles of microeconomics to life.

A second area of central importance is financial and monetary economics. We have completely reorganized our treatment of monetary economics by introducing a new chapter, “Financial Markets and the Special Case of Money.” This chapter places monetary economics in the larger context of finance and, along with the chapter on central banking, explores the critical role that money plays in the business cycle.

Drawing upon history, economic chronicles, and the authors’ experience, the eighteenth edition continues the use of case studies and empirical evidence to illustrate economic theories. The dilemmas involved in combating poverty hit home when we understand the 1996 welfare reforms. The need for economic approaches to the environment is illustrated by the dilemma of global warming. Our appreciation of

macroeconomic analysis increases when we see how government deficits lower national saving.

5. Debates about Globalization. The last decade has witnessed pitched battles over the role of international trade in our economies. Some argue that the decline in American manufacturing employment comes because jobs are exported to Mexico and China, although a careful analysis of job trends questions this assessment. Whatever the causes, the United States was definitely faced with the puzzle of rapid output growth and a decline in employment in the early 2000s.

One of the major debates of recent years has been over “globalization,” which concerns the increasing economic integration of different countries. Americans have learned that no country is an economic island. Immigration and international trade have profound effects on the goods that are available, the prices we pay, and the wages we earn. Terrorism can wreck havoc on the economy at home, while war causes famines and reduces living standards in Africa. No one can fully understand the impact of growing trade and capital flows without a careful study of the theory of comparative advantage. The eighteenth edition continues to increase the material devoted to international economics and the interaction between international trade and domestic economic events.

6. The Contending Schools of 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 people fret about the divisiveness of modern macroeconomics, we think it is a sign of health and prefer lively debate to complacent consensus.

The eighteenth edition analyzes all major schools of modern macroeconomics within the clear organizing synthesis of aggregate supply and demand. We show how macroeconomics of the Keynesian, old and new classical, real-business cycle, 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 discussed in Chapter 33, “The Warring Schools of Macroeconomics.” We also emphasize the importance of the *policy implications* of the different approaches.

Economists are increasingly examining the determinants of long-run economic growth, the 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 eighteenth edition reflects this revival by synthesizing growth theories and findings into the central section on macroeconomics.

7. Clarity. Although there are many new features in the eighteenth 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 how the world works. Our task is not to change students’ values. Rather, we strive to help students understand enduring economic principles so that they may better be able to apply them—to make the world a better place for themselves, 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 eighteenth 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 sections and chapters. 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

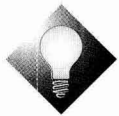
will challenge the most advanced young scholar. Indeed, many of today's leading economists have written to say they've relied upon *Economics* all along their pilgrimage to the Ph.D.

Format

The eighteenth edition employs an expanded set of in-text logos, and material to help illustrate the central topics. You will find three distinctive logos, indicating 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. Many believe 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 sequences 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 eighteenth 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 Gary Lemon of Depauw 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. The *Study Guides* are available electronically for online purchase or packaged with the text via code-card access.

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/samuelson18). The website also contains chapter summaries, self-grading practice quizzes, Web questions, and links to the websites suggested for further research at the end of each chapter.

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 eighteenth 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 an updated section at the end with suggestions for further reading and addresses 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 and are designed to reinforce economics concepts. They allow students to move at their own pace, and they 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 eighteenth 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 eighteenth edition. They include:

Mohammad Akacem, *University of Colorado, Denver*

Mohua Das, *Centre College*

George Euskirchen, *Thomas More College*

Adam Forest, *Seattle University*

Satyajit Ghosh, *University of Scranton*

Aroop Mahanty, *University of Maryland*

Donald Milley, *Youngstown State University*

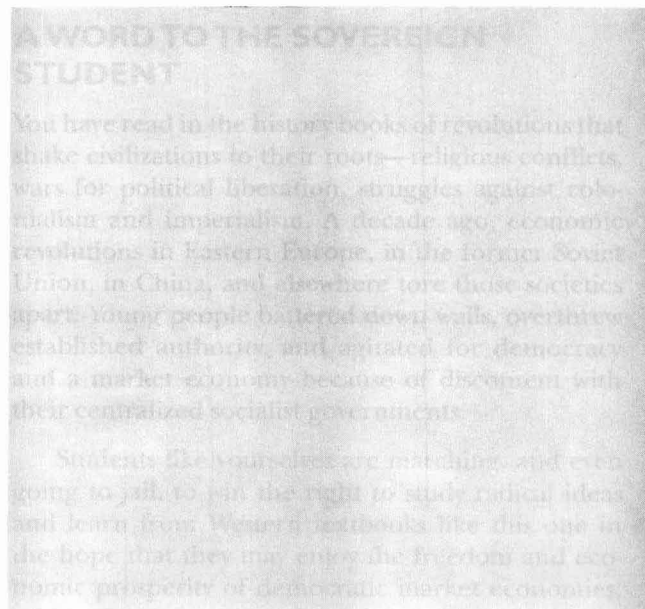
Ibrahim Oweiss, *Georgetown University*

Dennis Petruska, *Youngstown State University*

Edward Scahill, *University of Scranton*

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. Nancy King helped in logistics at the New Haven end of the operation.

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, Executive Editor Lucille Sutton, Developmental Editor Karen Minnich, Editorial Assistant Becca Hicks, Project Manager Susanne Riedell, Production Manager Becky Szura, and Marketing Manager Marty Quinn. This group of skilled professionals turned a pile of diskettes and a mountain of paper into a finely polished work of art.



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 James Tobin.

Skoal!

As you begin your journey into the land of markets, it would be understandable if you are 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. Its 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 major sources 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. 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 a fee.

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).

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 www.gpoaccess.gov/eop/index.html.

Most of the major economic data are 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.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 Bureau 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 Bureau publications available, the 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 indexes. 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. A 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 on 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 at one location. 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. 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 netec.mcc.ac.uk/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	45
PART TWO	MICROECONOMICS: SUPPLY, DEMAND, AND PRODUCT MARKETS	63
Chapter 4	Applications of Supply and Demand	65
Chapter 5	Demand and Consumer Behavior	84
Appendix 5	Geometrical Analysis of Consumer Equilibrium	101
Chapter 6	Production and Business Organization	107
Chapter 7	Analysis of Costs	124
Appendix 7	Production, Cost Theory, and Decisions of the Firm	142
Chapter 8	Analysis of Perfectly Competitive Markets	147
Chapter 9	Imperfect Competition and Monopoly	166
Chapter 10	Oligopoly and Monopolistic Competition	184
Chapter 11	Uncertainty and Game Theory	204
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	264
Appendix 14	Markets and Economic Efficiency	283

PART FOUR	APPLIED MICROECONOMICS: INTERNATIONAL TRADE, GOVERNMENT, AND THE ENVIRONMENT	291
Chapter 15	Comparative Advantage and Protectionism	293
Chapter 16	Government Taxation and Expenditure	318
Chapter 17	Promoting More Efficient Markets	341
Chapter 18	Protecting the Environment	361
Chapter 19	Efficiency vs. Equality: The Big Tradeoff	382
PART FIVE	MACROECONOMICS: ECONOMIC GROWTH AND BUSINESS CYCLES	403
Chapter 20	Overview of Macroeconomics	405
Appendix 20	Macroeconomic Data for the United States	423
Chapter 21	Measuring Economic Activity	424
Chapter 22	Consumption and Investment	445
Chapter 23	Business Fluctuations and the Theory of Aggregate Demand	466
Chapter 24	The Multiplier Model	481
Chapter 25	Financial Markets and the Special Case of Money	502
Chapter 26	Central Banking and Monetary Policy	531
PART SIX	GROWTH, DEVELOPMENT, AND THE GLOBAL ECONOMY	553
Chapter 27	The Process of Economic Growth	555
Chapter 28	The Challenge of Economic Development	577
Chapter 29	Exchange Rates and the International Financial System	598
Chapter 30	Open-Economy Macroeconomics	619
PART SEVEN	UNEMPLOYMENT, INFLATION, AND ECONOMIC POLICY	643
Chapter 31	Unemployment and the Foundations of Aggregate Supply	645
Chapter 32	Ensuring Price Stability	667
Chapter 33	The Warring Schools of Macroeconomics	690
Chapter 34	Policies for Growth and Stability	709
Glossary of Terms		731
Index		754

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 3 • 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 • A Smooth Curve • Slopes and Lines • Slope of a Curved Line • Shifts of and Movement along Curves • Some Special Graphs •

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

Chapter 2

Markets and Government in a Modern Economy 25

The Mixed Economy •

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 35 • Imperfect Competition • Externalities • Public Goods • Equity 38 • Macroeconomic Growth and Stability 39 • Twilight of the Welfare State? 40 • The Mixed Economy Today •

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

Chapter 3

Basic Elements of Supply and Demand 45

A. The Demand Schedule 46

The Demand Curve 47 • Market Demand • Forces behind the Demand Curve • Shifts in Demand •

B. The Supply Schedule 51

The Supply Curve 51 • Forces behind the Supply Curve • Shifts in Supply •

C. Equilibrium of Supply and Demand 54

Equilibrium with Supply and Demand Curves 55 • Effect of a Shift in Supply or Demand • Interpreting Changes in Price and Quantity • Supply, Demand, and Immigration • Rationing by Prices 59 •

Summary 60 • Concepts for Review 61 • Further Reading and Internet Websites 61 • Questions for Discussion 61 •



PART TWO

MICROECONOMICS: SUPPLY, DEMAND, AND PRODUCT MARKETS

63

Chapter 4

Applications of Supply and Demand 65

A. Price Elasticity of Demand and Supply 65

Price Elasticity of Demand 66 • Calculating Elasticities • Price Elasticity in Diagrams • Elasticity and Revenue 70 • The Paradox of the Bumper Harvest • Price Elasticity of Supply 72 •

B. Applications to Major Economic Issues 73

The Economics of Agriculture 74 • Long-Run Relative Decline of Farming • Impact of a Tax on Price and Quantity 75 • Minimum Floors and Maximum Ceilings 77 • The Minimum-Wage Controversy • Energy Price Controls •

Summary 81 • Concepts for Review 82 • Further Reading and Internet Websites 82 • Questions for Discussion 82 •

Chapter 5

Demand and Consumer Behavior 84

Choice and Utility Theory 84 • Marginal Utility and the Law of Diminishing Marginal Utility • A Numerical Example • Equimarginal Principle: Equal Marginal Utilities per Dollar for Every Good 87 • Why Demand Curves Slope Downward • Leisure and the Optimal Allocation of Time • An Alternative Approach: Substitution Effect and Income Effect 89 • Substitution Effect • Income Effect • From Individual to Market Demand 90 • Demand Shifts • Substitutes and Complements • Empirical Estimates of Price and Income Elasticities • The Economics of Addiction 93 • The Paradox of Value 95 • 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 101

The Indifference Curve 101 • Law of Substitution • The Indifference Map • Budget Line or Budget Constraint 103 • The Equilibrium Position of Tangency 104 • Changes in Income and Price 104 • Income Change • Single Price Change • Deriving the Demand Curve 105 •

Summary to Appendix 106 • Concepts for Review 106 • Questions for Discussion 106 •

Chapter 6

Production and Business Organization 107

A. Theory of Production and Marginal Products 107

Basic Concepts 107 • The Production Function • Total, Average, and Marginal Product • The Law of Diminishing Returns • Returns to Scale 111 • Short Run and Long Run 112 • Technological Change 113 • 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 118 • The Individual Proprietorship • The Partnership • The Corporation •

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

Chapter 7

Analysis of Costs 124

A. Economic Analysis of Costs 124

Total Cost: Fixed and Variable 124 • Fixed Cost • Variable Cost • Definition of Marginal Cost 125 • Average Cost 127 • Average or Unit Cost • Average Fixed and Variable Cost • Minimum Average Cost • The Link between Production and Costs 130 • Diminishing Returns and U-Shaped Cost Curves • Choice of Inputs by the Firm 132 • Marginal Products and the Least-Cost Rule • Financial Finagling •

B. Economic Costs and Business Accounting 133

The Income Statement, or Statement of Profit and Loss 133 • The Balance Sheet 135 • 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 • **Profit Maximization** • **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 **158**
Evaluating the Market Mechanism 158 • **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** • **The Role of Government Intervention** •

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

Chapter 9 **Imperfect Competition and 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 174 • **Price, Quantity, and Total Revenue** • **Marginal Revenue and Price** • **Elasticity and Marginal Revenue** • **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** **184**

A. Behavior of Imperfect Competitors **184**
Measures of Market Power • **The Nature of Imperfect Competition** 186 • **Theories of Imperfect Competition** 186 • **Collusive Oligopoly** • **Monopolistic Competition** • **Rivalry among the Few** • **Game Theory** • **Price Discrimination** 191 •

B. Innovation and Information **192**
Behavior of Large Corporations 192 • **Divorce of Ownership and Control** • **Information, Innovation, and Schumpeterian Economics** 193 • **The Economics of Information** • **Intellectual Property Rights** • **The Dilemma of the Internet** • **The Schumpeterian Hypothesis** •

C. A Balance Sheet on Imperfect Competition **197**
Economic Costs of Imperfect Competition 197 • **The Cost of Inflated Prices and Insufficient Output** • **Measuring the Waste from Imperfect Competition** • **Intervention Strategies** 198 •

Summary 200 • **Concepts for Review** 201 • **Further Reading and Internet Websites** 201 • **Questions for Discussion** 202 •

Chapter 11

Uncertainty and Game Theory 204

A. Economics of Risk and Uncertainty 205

Speculation: Shipping Assets or Goods across Space and Time 205 • Arbitrage and Geographic Price Patterns • Speculation and Price Behavior over Time • Shedding Risks through Hedging • The Economic Impacts of Speculation • **Risk and Uncertainty 208** • **Insurance and Risk Spreading 210** • 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 213** • Alternative Strategies • **Some Important Examples of Game Theory 216** • 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 222** •



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 235** • **The Distribution of National Income 237** • Marginal-Productivity Theory with Many Inputs • **An Invisible Hand for Incomes? 239** •

Summary 239 • **Concepts for Review 240** • **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 249** • 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. Labor Market Issues and Policies 253

History and Practice of Labor Unions 253 • Government and Collective Bargaining • **How Unions Raise Wages 254** • Theoretical Indeterminacy of Collective Bargaining • **Effects on Wages and Employment 256** • Has Unionization Raised Wages? • Effects on Employment • **Discrimination 257** • **Economic Explanations of Discrimination 257** • Definition of Discrimination • Discrimination by Exclusion • Taste for Discrimination • Statistical Discrimination • **Economic Discrimination against Women 259** • Empirical Evidence 259 • **Reducing Labor Market Discrimination 260** • Uneven Progress •

Summary 260 • **Concepts for Review 261** • **Further Reading and Internet Websites 262** • **Questions for Discussion 262** •

Chapter 14

Land and Capital 264

A. Land and Rent 264

Rent as Return to Fixed Factors • Taxing Land •

B. Capital and Interest 267

Basic Concepts 267 • 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 269** • Present Value for Perpetuities • General Formula for Present Value • Acting to Maximize Present Value • **Profits 271** • Reported Profit Statistics • Determinants of Profits • Review • **The Theory of Capital and Interest 273** • Roundaboutness • Diminishing Returns and the