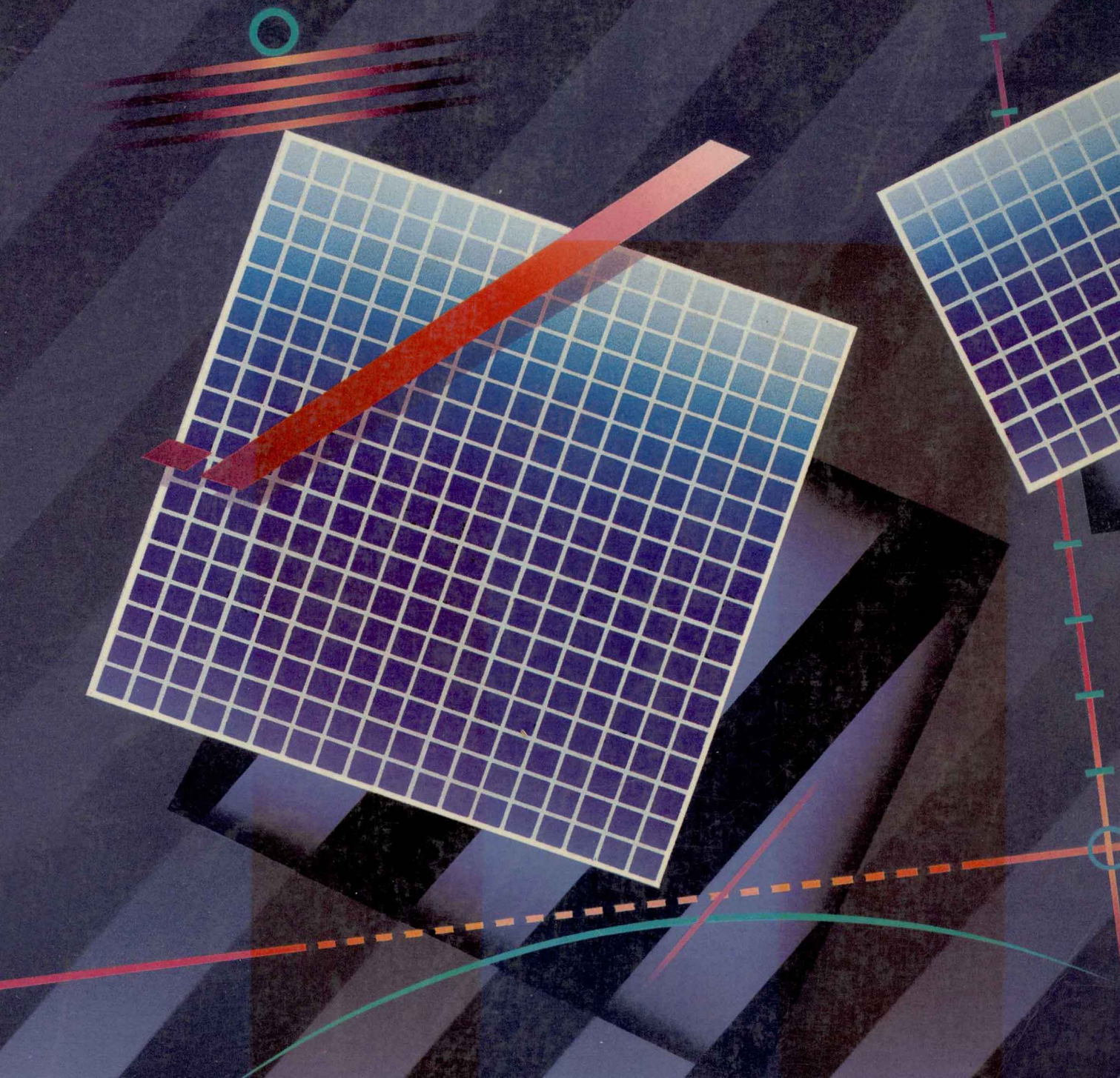


# MACROECONO

PAUL A. SAMUELSON AND WILLIAM D. NORDHAUS





# MACROECONOMICS

A VERSION OF ECONOMICS

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## MACROECONOMICS

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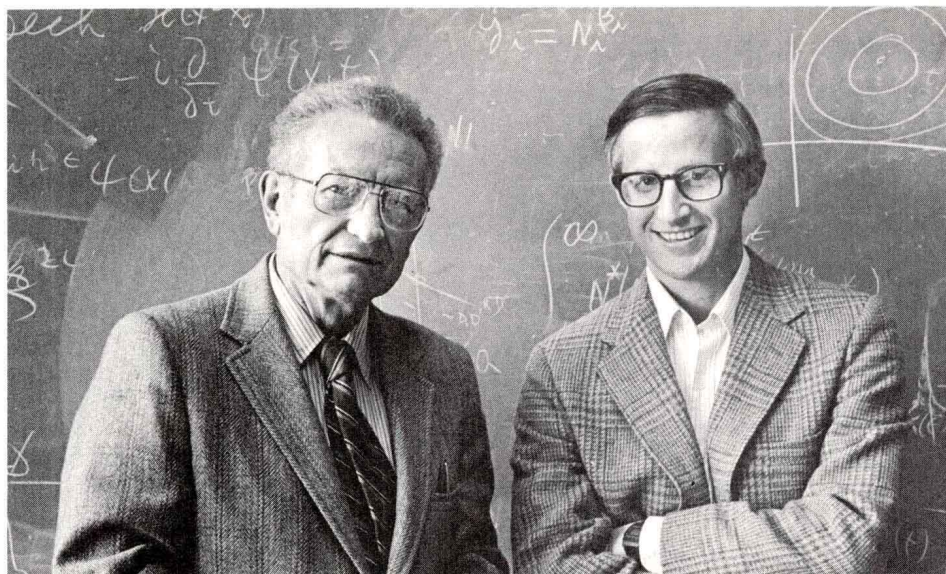
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# ABOUT THE AUTHORS

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**Paul A. Samuelson** (*left*) founder of the renowned MIT graduate department of economics, was trained at the University of Chicago and Harvard. His many scientific writings brought him world fame at a young age, and he was the first American to receive a Nobel Prize in economics (1970). One of those rare scientists who can communicate with the lay public, Professor Samuelson long wrote an economics column for *Newsweek*. He testifies often before Congress and serves as academic consultant to the Federal Reserve, the U.S. Treasury, and various private, nonprofit organizations. He was economic adviser to President John F. Kennedy. Professor Samuelson plays tennis daily, and his family's size doubled when triplets arrived.

**William D. Nordhaus** (*right*) is one of America's eminent economists. Born in New Mexico, he was an undergraduate at Yale, received his Ph.D. in economics at MIT, and is now the John Musser Professor of Economics at Yale University and a member of the Cowles Foundation for Research in Economics. His economic research has spanned a wide variety of topics—including inflation, energy, technological change, regulation, resource and environmental economics, and trends in profits and productivity. In addition, Professor Nordhaus takes a keen interest in economic policy. He served as a Member of President Carter's council of Economic Advisors from 1977 to 1979 and writes occasionally for *The New York Times* and other periodicals. From 1986 to 1988, he served as Provost of Yale University; in this capacity he negotiated a labor contract, helped invest a large endowment, oversaw a major investment program, and managed a large organization. He regularly teaches the Principles of Economics course at Yale. Professor Nordhaus and his family live in New Haven, Connecticut and share an enthusiasm for music, hiking, and skiing.

# PREFACE TO MACROECONOMICS

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*Books are the carriers of civilization. Without books, history is silent, literature dumb, science crippled, thought and speculation at a standstill. They are engines of change, windows on the world, lighthouses erected in a sea of time.*

*Barbara Tuchman*

THIS book has served as the standard bearer for the teaching of elementary economics since the landmark 1948 edition. Each new edition has distilled the deepest thinking of economists about how the economy works and about what society can do to improve people's living standards.

But economics is an evolving science; it must solve emerging puzzles and grapple with current dilemmas of public policy. The 1980s saw the emergence of a new approach to macroeconomic policy called "supply-side economics"; the United States began to incur huge federal budget deficits and trade deficits; East Asian countries challenged American preeminence in world economic affairs; and the United States grew rapidly while Latin America stagnated under a heavy burden of foreign indebtedness.

All these and a host of other issues test the ingenuity of modern economics. The need to keep *Economics* at the forefront of modern economic analysis in the rapidly evolving world economy motivated the fruitful collaboration of the twelfth edition—a collaboration between two scholarly generations. This thirteenth edition continues that new tradition, affording the authors an exciting opportunity to forge a synthesis of modern mainstream economics and to present the doctrines of the warring factions of Keynesian and



### 1. Increased Emphasis on International Economics

Americans are learning that no nation is an island. Our living standards are affected by technological developments in Japan and Germany; our companies must contend with competitors from Korea and Brazil. Similarly, no complete understanding of modern economics is possible without a thorough grounding in the world economy. The thirteenth edition therefore contains a new emphasis on the essential elements of international economics.

The major new theme in this edition is a completely revised treatment of open-economy macroeconomics, for which the primary discussion occurs in Chapter 9. This exposition demonstrates the linkage between international trade and domestic output and employment and explains how events abroad can cause business cycles at home.

Other new material on the world economy includes: an application of open-economy macroeconomics to cities and regions in Chapter 9; an up-to-date analysis of the debt crisis in Chapter 19; a new presentation of the theory of comparative advantage in Chapter 20; an analysis of the reasons behind economists' realistic disillusionment with floating exchange rates in Chapter 22; and a survey of the problem of the stubborn U.S. trade deficit and growing foreign indebtedness in Chapter 22.

### 2. Microeconomic Foundations of Macroeconomics

Some may feel that an analysis of the microeconomic foundations of macroeconomics is too advanced for introductory textbooks. We disagree. Our thirteenth edition presents a straightforward survey of the economic underpinnings of modern mainstream macroeconomics. This includes an analysis of the reason for the non-vertical aggregate supply curve and of the role of contracts in the inflexibility of wages. Our exposition provides an analysis of the foundations of aggregate supply theory in Chapter 8; a survey of the microeconomic foundations of the theory of involuntary unemployment in Chapter 13; and a concise description of the theory and evidence on rational-expectations macroeconomics in Chapter 16.

### 3. Balanced Treatment of Modern Macroeconomics

This new edition features all major schools of modern macroeconomics: Keynesian, classical, monetarist, and supply-side. Each is clearly presented and compared with its competitors in a balanced and evenhanded way. For each, the empirical evidence is presented and evaluated.

Among the major revisions are Chapter 8's alternative approaches to macroeconomics with a special emphasis on the contrast of Keynesian and classical viewpoints, Chapter 10's appraisal of the theory and experience of supply-side economics, and Chapter 16's analysis of new trends in monetary thinking.

### 4. Earlier Coverage of Money and the Banking System

In response to requests from many users of this book, the coverage of money and of the banking system has been placed earlier in the text. It has also been substantially revised. Chapter 11 now brings together such topics as the history of money and banks, the demand for money, and the money supply. Chapter 12, on the Federal Reserve System, also placed earlier than in previous editions, is fully updated. It contains a new section on interest rates, as well as an explanation of the changing views on the

effectiveness of targeting the money supply. Instructors can now explore the policy issues of unemployment and inflation, and input-output determination, with a firm foundation on the monetary system.

### 5. Clear Exposition of Major Ideas

We have pored over every chapter to improve the clarity of the exposition. The comments of over 1000 students as well as suggestions of teachers, practitioners, and experts have been incorporated in the thirteenth edition.

The introductory chapter now spells out the essence of economics with intriguing and important illustrations; more than 100 new end-of-chapter examples have been added to focus student attention on key concepts or policy issues; the exposition of the aggregate supply and demand mechanism in Chapters 5 through 8 has been expanded and clarified; the treatment of comparative advantage in Chapter 20 has been revised for greater coherence; new tables help summarize essential points of analysis, and new sections on interest rates, expectations, economic growth, and comparative advantage help deepen students' understanding.

The glossary, which was first introduced in the twelfth edition, has been carefully tuned to meet the needs of this edition; all major terms now have a capsule definition that students can easily turn to. As a new study aid, the most important terms are printed in boldface when first defined in the text; they all then appear again in the glossary to reinforce the indispensable vocabulary of economics in the student's mind.

One of the distinguishing features of *Economics* has been the presentation of central but sometimes advanced theories in understandable ways. For the thirteenth edition we have redrafted the chapters on the foundations of aggregate supply and demand, the classical approach to macroeconomics, and the relationship between the domestic economy and the rest of the world to make these topics understandable to beginning students.

### 6. Increased Emphasis on History and Policy

Economics is at its core an empirical science. It first aims to explain the world around us and then helps us craft economic policies, based on sound economic principles, that can improve society's real-world functioning.

Drawing upon history, economic chronicles, and the authors' experience, *Macroeconomics* places a renewed emphasis on empirical evidence to illustrate economic theories. Understanding of macroeconomic analysis is aided by an understanding of the trends in federal budget deficits and a description of the Gramm-Rudman legislation; the dilemmas of monetary policy become clearer when the political business cycle and the 1979–1982 monetarist experiment are surveyed; and international economics comes to life when the surging U.S. trade deficit and the successes of outward-oriented countries are analyzed.

This “hands-on” approach to economics allows students to understand better the relevance of economic analysis to real-world problems.

### 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 placed in appendixes or specially designated sections. These will appeal to curious students and to demanding courses that want to survey the entire discipline thoroughly. As is traditional with this book, we have included advanced problems 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 students can skip the advanced sections, encountering the core of macroeconomic analysis without losing the thread of economic reasoning. And for those who teach the bright honors students, this book will challenge the most advanced young scholar. Indeed, many of today's leading economists have written to say they have used parts of *Economics* all along their pilgrimage to the Ph.D.

## **Format**

The thirteenth edition has adapted the successful new format introduced in the last edition. There are more headings to remind the student of the thrust of the argument. Special footnotes (in gray boxes) are reserved for important and useful illustrations of the core material in the chapter.

New features in this edition include scores of fresh end-of-chapter questions, with a special emphasis upon short problems that reinforce the major concepts surveyed in the chapter. Terms printed in bold type mark the first occurrence and definition of the most important words that constitute the language of economics. And many tables and figures have been added or redrawn to crystallize essential parts of the analysis.

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

## **The Macroeconomics Split Edition**

An important innovation in the thirteenth edition is the decision to provide two paperback volumes, *Macroeconomics* (Chapters 1–17 and 36–40 of the full text) and *Microeconomics* (Chapters 1–4 and 18–40 of the full text). This new format will allow greater economy and flexibility to the one-semester or one-quarter course.

In designing the paperback split editions, we have made each split completely self-contained. You can move straight through the chapters in *Macroeconomics* knowing that the exposition, cross-references, and examples have been tailored with your needs in mind. At the same time, no material has been cut from this split edition, so you can be confident that a careful study of *Macroeconomics* will provide the full range of analysis, policy discussion, and history that is given in the full text. Whether your special interest is the declining national savings rate, the impact of economic policy on the natural rate of unemployment, or the reasons behind the large trade deficit, you can find in these pages the entire discussion of macroeconomics contained in the thirteenth edition of *Economics*.

## **Auxiliary Teaching and Study Aids**

Students of this edition will benefit greatly from the *Study Guide*. This carefully designed aid has been prepared by Professor Gary Yohe of Wesleyan University, who



worked in close collaboration with us in our revision. Both when used alongside classroom discussions and when employed independently for self-study, the *Study Guide* has proved to be an impressive success.

In addition, instructors will find the *Instructor's Manual and Test Bank* useful for planning their courses and preparing multiple sets of test questions in both print and computerized format. Moreover, McGraw-Hill has designed a beautiful set of two-color overhead transparencies for presenting the tabular and graphical material in the classroom.

## Economics in the Computer Age

This edition is accompanied by the *Interactive Economic Graphic Tutorial* to accompany Samuelson/Nordhaus which combines text, graphics, page references to the book, and key concepts on the same screen. Shifts in curves are shown by arrows that guide the student through economic processes step by step. The program is available for the IBM PC and compatibles; it will reinforce the text and provide personal instruction for the central concepts of *Economics*.

## 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 thirteenth edition of *Economics*.

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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.

A small group of student coworkers devoted their time and energy to this edition, especially Larry Burtshy, Howard Chang, Akiva Dickstein, Elizabeth Gregory, Keith Hwang, Martin Lariviere, John Garen, and Don Smythe. The statistical and historical material was prepared and double-checked by Tan Yong Hui. Clerical assistance was provided by Glenna Ames. Judith Hickey provided invaluable editorial, logistical, and stylistic assistance.

McGraw-Hill’s New York team included Designer Joan O’Connor, Senior Editing Supervisor Peggy Rehberger, Assistant Production Manager Diane Renda, and Economics Editor Scott Stratford, along with Senior Editor Elisa Adams who provided unerring advice from the inception of this edition to its completion. This group of skilled professionals turned a mountain of paper into a finely polished work of art.

## TO THE SOVEREIGN READER

The thirteenth edition marks the fortieth birthday of *Economics*. The first twelve editions of this book have opened the world of economics to millions of students around the world, and this edition can also serve you well.

One book studied in a single course cannot make you an expert in the subject. But then, most students are not pursuing careers in economics. Rather, you are likely to be concerned with gaining a basic understanding of how our complex economy works. We have therefore laid out a survey of the essential concepts and policy problems of modern macroeconomics as simply as we can, omitting no important topics, using no misleading oversimplifications, but burdening you with no unnecessary complications.

Who has been uppermost in our minds as we wrote this thirteenth edition? You, the



beginning student. On every page we have asked: What are the crucial forces that will influence our economy in the 1990s and the early twenty-first century? What tools will be most helpful for men and women entering careers in business, law, government, and the 1001 other paths that young people follow?

At every point in the writing of this edition we have worked to clarify and sharpen the analysis, to make sure the tables and charts are well labeled, and to check for the relevance of each historical illustration.

### The Intellectual Marketplace

Economics studies the markets for corn and wheat, stocks and bonds, French francs and Japanese yen, unskilled labor and highly trained neurosurgeons. There is also a marketplace of ideas, where contending schools of economists develop their theories and attempt to persuade their colleagues. You will find a fair and impartial review of the thinking of the intellectual giants of our profession in the chapters that follow—from the early economists like Adam Smith and David Ricardo to modern-day titans like John Maynard Keynes and Robert Solow.

You have probably read in the newspaper about the gross national product, the consumer price index, the stock market, and the unemployment rate. After you have completed a thorough study of macroeconomics in this textbook, you will not only know precisely what these words mean; you will also understand the economic forces that influence and determine them.

### How to Study Economics

We have designed this book so that it can be fruitfully used by the beginning freshman as well as by advanced students in the severest honors course. It is carefully layered so that each reader can pursue topics quickly or in depth.

#### Divide and Conquer

No one can tell you the best way to read a textbook, for individual styles differ greatly among students. But educators and psychologists offer counsel about certain tried-and-true methods that will help you learn the subject more quickly and retain the material longer.

To begin with, this is obviously not a novel or a detective story. Economics is best learned by daily study in small chunks. Don't wait until 2 or 3 days before a test to begin your studies; make steady progress through the material by keeping up with the assigned reading.

For each chapter, begin by searching for the basic ideas for perspective. You may first want to skim through the material, look at the summary, and study the major concepts and definitions. Next, read the material carefully, underlining the important sentences and taking notes on focal ideas. Then refresh your memory by reading the final summary, reviewing the major concepts, and going back through the chapter to doublecheck the highlights.

#### Read Actively

Above all, be an active participant in your study. Always ask yourself, "Why is this important?" or "What is a current example of this theory?" Think of new examples as



you study the text. Read the newspaper to witness economic history unfolding daily. Argue about the analysis or examples with your teachers and classmates. Do the end-of-chapter questions and work through Professor Gary Yohe's *Study Guide* to help cement the important concepts in your mind and test the limits of your understanding.

### Skoal!

Our envy goes with 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 begin, we wish you bon voyage!

*Paul A. Samuelson*  
*William D. Nordhaus*



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