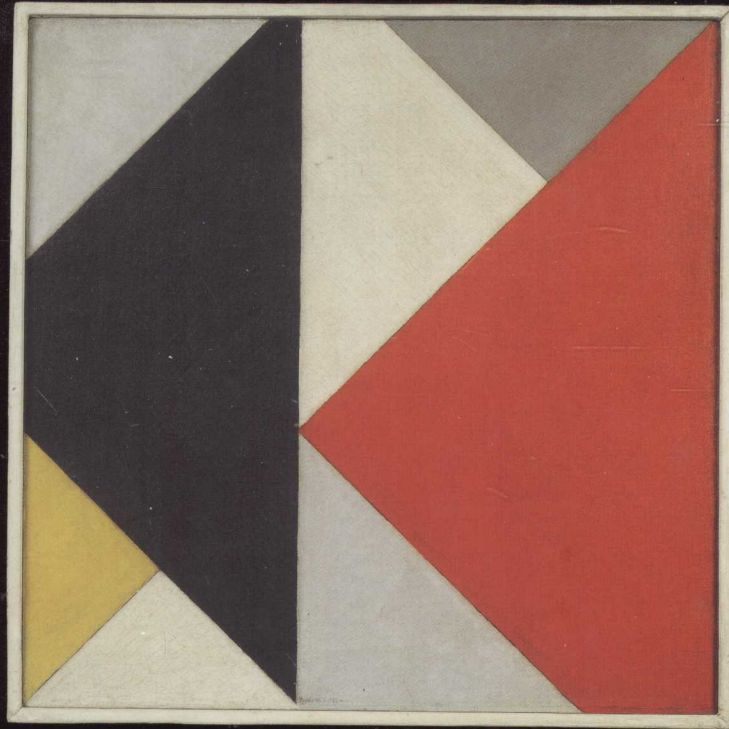


NINTH EDITION



macroeconomics

RUDIGER DORNBUSCH

STANLEY FISCHER

RICHARD STARTZ



30804729



MACROECONOMICS

Ninth Edition

RUDIGER DORNBUSCH

Late of Massachusetts Institute of Technology
Ford Professor of Economics and
International Management



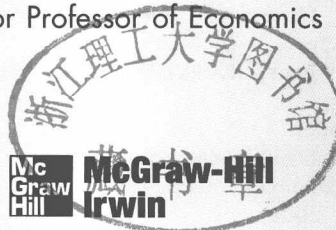
STANLEY FISCHER

Citigroup



RICHARD STARTZ

University of Washington
Castor Professor of Economics



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



MACROECONOMICS

Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY, 10020. Copyright © 2004, 2001, 1998, 1994, 1990, 1987, 1984, 1981, 1978 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.

This book is printed on acid-free paper.

2 3 4 5 6 7 8 9 0 DOC/DOC 0 9 8 7 6 5 4

ISBN 0-07-282340-2

Publisher: Gary Burke

Executive sponsoring editor: Lucille Sutton

Editorial coordinator: Karen Minnich

Marketing manager: Martin D. Quinn

Producer/coordinator, Media technology: Cbet Smith

Senior project manager: Christine A. Vaughan

Senior production supervisor: Michael R. McCormick

Designer: Adam Rooke

Supplement producer: Matthew Perry

Senior digital content specialist: Brian Nacik

Cover image: *Theo van Doesburg, Counter-Composition XIII, 1925–1926. Oil on canvas, 19 5/8 × 19 5/8 inches (49.9 × 50 cm). The Solomon R. Guggenheim Foundation, New York, Peggy Guggenheim Collection, Venice, 1976*

Typeface: 10/12 Times New Roman

Compositor: The GTS Companies/York, PA Campus

Printer: R. R. Donnelley

Library of Congress Cataloging-in-Publication Data

Dornbusch, Rudiger.

Macroeconomics / Rudiger Dornbusch, Stanley Fischer, Richard Startz.—9th ed.

p. cm.

Includes index.

ISBN 0-07-282340-2 (alk. paper)

1. Macroeconomics. I. Fischer, Stanley. II. Startz, Richard, 1952- III. Title.

HB172.5.D67 2004

339—dc22

2003059968



ABOUT THE AUTHORS

RUDI DORNBUSCH (1942–2002) was Ford Professor of Economics and International Management at MIT. He did his undergraduate work in Switzerland and held a Ph.D. from the University of Chicago. He taught at Chicago, at Rochester, and from 1975 to 2002 at MIT. His research was primarily in international economics, with a major macroeconomic component. His special research interests included the behavior of exchange rates, high inflation and hyperinflation, and the problems and opportunities that high capital mobility pose for developing economies. He lectured extensively in Europe and in Latin America, where he took an active interest in problems of stabilization policy, and held visiting appointments in Brazil and Argentina. His writing includes *Open Economy Macroeconomics* and, with Stanley Fischer and Richard Schmalensee, *Economics*.

STANLEY FISCHER is vice chairman of Citigroup and president of Citigroup International. From 1994 to 2002 he was first deputy managing director of the International Monetary Fund. He was an undergraduate at the London School of Economics and has a Ph.D. from MIT. He taught at the University of Chicago while Rudi Dornbusch was a student there, starting a long friendship and collaboration. He was a member of the faculty of the MIT Economics Department from 1973 to 1998. From 1988 to 1990 he was chief economist at the World Bank. His main research interests are economic growth and development; international economics and macroeconomics, particularly inflation and its stabilization; and the economics of transition. www.iie.com/fischer

RICHARD STARTZ is Castor Professor of Economics at the University of Washington. He was an undergraduate at Yale University and received his Ph.D. from MIT, where he studied under Stanley Fischer and Rudi Dornbusch. He taught at the Wharton School of the University of Pennsylvania before moving on to the University of Washington, and he has taught, while on leave, at the University of California–San Diego, the Stanford Business School, and Princeton. His principal research areas are macroeconomics, econometrics, and the economics of race. In the area of macroeconomics, much of his work has concentrated on the microeconomic underpinnings of macroeconomic theory. His work on race is part of a long-standing collaboration with Shelly Lundberg. www.econ.washington.edu/user/startz

*To Fine, Rhoda, and Shelly
and to the memory of
Rudi,
teacher/colleague/friend*



PREFACE

The ninth edition of *Macroeconomics* is published 25 years after the first. We have been both amazed and flattered by the response our book has received over those years. Besides its use in the classrooms of many U.S. universities, it has been translated into many languages and used in many countries, from Canada to Argentina to Australia; all over Europe; in India, Indonesia, and Japan; and from China and Albania to Russia. Even before the Czech Republic gained independence from communism, an underground translation was secretly used in macroeconomics seminars at Charles University in Prague. There is no greater pleasure for teachers and textbook authors than to see their efforts succeed so concretely around the world.

We believe that the success of our textbook reflects the unique features it brings to the universe of undergraduate macroeconomics. These features can be summarized as follows:

- “*Compassionate Difficulty*” Through the years we have held the conviction that the best textbook is one written with an abiding respect for both student and instructor. What does this mean exactly? In practice it means that we explore more state-of-the-art research than is customary in undergraduate textbooks, allowing students a point of departure for deeper exploration of various topics and teachers the flexibility to emphasize topics in greater detail. At the same time, however, we have reduced the book’s level of difficulty by providing straightforward explanations, emphasizing concepts over technique, and fitting difficult material into a larger framework so students can see its relevance. We also emphasize how empirical data can explain and test macroeconomic theory by providing numerous illustrations using real-world data.
- *Focus on Models* The best economists have a rich toolbox of simple models they can use to analyze various facets of the economy and know when to apply the right model to answer specific questions. We have consistently focused our textbook on the presentation of a series of simple models relevant to particular issues. We strive to help students understand the importance of a model-based approach to macroeconomic analysis as well as how the various models are connected. Our goal is to produce students who have the capacity to analyze current economic issues in the context of an economic frame of reference, namely, a set of macroeconomic models.

- *International Perspective* It has always been important for students living in countries with highly open economies to understand the important links connecting foreign economies to their own. This is also becoming ever more true in the United States as international goods and financial markets become more intertwined. Recognizing this, we provide two detailed chapters discussing international linkages. The first, Chapter 12, provides a discussion of mainstream intermediate macroeconomic topics. The second, Chapter 19, gives advanced students the opportunity to explore modern theories of balance-of-payments crises, determinants of exchange rates, and the choice of exchange rate regimes. These chapters give instructors the flexibility to range from touching on a few international topics to a thorough discussion lasting several weeks.
- *Focus on Changing Times* In preparing this edition we were surprised by how many issues have emerged and how many have become moot in just the three short years since the last edition of the textbook was published. We have strived to present updated data throughout the book, demonstrating key trends and thorough discussions of how such trends might be explained by traditional macroeconomic models.

PLANS OF ATTACK

A major goal in writing this textbook is to provide one that is comprehensive yet flexible enough to allow teachers to focus a class on their particular interests and time constraints. Our personal preference is to begin at the beginning and work through the entire book (which is, of course, why we organized the material in the way we did), but a number of approaches can be taken to give a different emphasis or simply to reduce the breadth of material covered. Examples of these approaches include

- *An Overview Course* An overview course should contain what we feel is the core of the textbook: Chapters 1 and 2, which introduce the book and provide details on national income accounting; Chapter 5, which gives an overview of aggregate supply and demand; Chapter 6, which presents the aggregate supply curve in more detail; Chapter 7, which discusses the headline issues of inflation and unemployment; and Chapters 9, 10, and 11, which introduce the goods market, asset market, and some basics of monetary and fiscal policy. Beyond these core chapters the course can be shortened substantially by omitting chapters that focus on the microeconomic detail beneath macroeconomic theory—Chapters 13–17 and 20, for example, which supply such detail for consumption, investment, and money markets, respectively. And Chapters 8 and 18, which detail several current issues in policymaking, can be omitted or done only in part. In the United States, Chapters 4, 12, and 19, which present many basic issues of international interdependence and growth policy, might also be omitted (although probably everyone should do Sections 12-1 and 12-2).
- *A Traditional Aggregate Demand-Oriented Course* For a Keynesian, short-run treatment of the course, the core chapters for the overview course should be emphasized and Chapter 8, which discusses policy, added. Chapter 18, which discusses big macroeconomic events, can be moved ahead of Chapter 13. Chapters 3 and 4,

on growth and policies to promote growth, can be moved to the end of the course. And for advanced students, the sections on New Keynesian economics in Chapter 20 might be included.

- *A Classical “Supply-Side” Course* For a classical treatment of the course the core chapters for the overview course can be shortened by de-emphasizing the *IS-LM* material in Chapters 9–11. And in the early chapters greater emphasis might be given to Chapters 3 and 4 on long-run growth. The microeconomics of macroeconomic theory in Chapters 13–15 might also be emphasized, as might the discussion of hyperinflation in Chapter 18. Advanced students may wish to explore the sections on the random walk in GDP and on real business cycles in Chapter 20.
- *A Business School Course* In addition to the core chapters for the overview course, a business school course should emphasize Chapters 16 and 17, which deal with the Federal Reserve and financial markets. And Chapters 3 and 4 on growth can be de-emphasized, while the advanced topics in Chapter 20 can be omitted. For students with an international perspective, Chapter 12 and parts of Chapter 19, especially the discussion of exchange rate determination, might be emphasized.

Throughout the book, we have labeled some material that is technically difficult as “optional.” Many of the optional sections will be fun for students who enjoy a technical challenge, but the instructor should specify clearly which of these sections are required and which are truly optional.



ACKNOWLEDGMENTS

In the past we have acknowledged our debts to correspondents, colleagues, and students individually. There is no longer room to do that, but we have to depart from our new rule to thank Erika Gulyas for assistance diligent, unerring, and frequently inspired.

Our best efforts notwithstanding, small errors do creep into the text. We are ever grateful to our readers for drawing our attention to such so that they may be squashed. Particular thanks go to Catherine Langlois, Martha Olney, Edward Steinberg, and Jimmy Torrez.

In addition, the authors and McGraw-Hill would like to thank the following teachers for reviewing both this edition and the previous ones.

Current edition: Robert Burrus, University of North Carolina–Wilmington; E. Mine Cinar, Loyola University–Chicago; Loretta Fairchild, Nebraska Wesleyan University; Roy Gobin, Loyola University–Chicago; Jang-Tin Guo, University of California–Riverside; William Hamlen, SUNY–Buffalo; Robert Herren, North Dakota State University; Kangoh Lee, Towson State University; Ossma Mikhail, University of Central Florida; Michael Miller, DePaul University; Walter Padelford, Union University; and Robert Edward Wright, University of Sterling, United Kingdom.

Previous editions: Michael Ben-Gad, University of Houston; David Butler, University of Western Australia; E. Mine Cinar, Loyola University–Chicago; Monoranjana Dutta, Rutgers University; Michael Edelstein, Queens College–CUNY; James R. Gale, Michigan Technological University; Steven L. Green, Baylor University; Oscar Jornda, University of California–Davis; Garry MacDonald, Curtin University; Neil B. Niman, University of New Hampshire; Martha Olney, University of California–Berkeley; John

Prestage, Edith Cowan University; Willem Thorbecke, George Mason University; and Robert Windle, University of Maryland.



SUPPLEMENTARY MATERIAL

An *Instructor's Manual* and *Test Bank* to accompany the text have been prepared by Professor Juergen Fleck of Hollins University. The *Instructor's Manual* has been substantially updated and includes chapter summaries, learning objectives, solutions to the end-of-chapter problems, and many additional problems (and their solutions) that can be used for class discussion, homework assignments, or examination questions. The *Test Bank* has been expanded and now includes more than 1,000 questions. And there is also a computerized (Windows) test bank that has been provided by Brownstone's Diploma, sophisticated test-making software that ensures maximum flexibility in test development.

The *Study Guide*, by Arabinda Basistha of West Virginia University, has again been revised and brought up to date. It contains a wide range of questions, starting from the very easy and progressing in each chapter to material that will challenge the more advanced student. The *Study Guide* is a great help in studying, particularly since active learning is so important in mastering new material.

For this edition there will also be *transparency masters* and *PowerPoint* slides of all the graphs in the book, along with a *website* (www.mhhe.com/economics/dornbusch) that provides study aids for students and useful resources for teachers.

Stanley Fischer
Richard Startz



ONLINE LINKS FOR FURTHER EXPLORATION

www.economagic.com

Economagic: A comprehensive site of free, easily available economic time series data useful for economic research, in particular economic forecasting. This site gives easy access to large amounts of data, and includes built-in graphing facilities.

www.nber.org/cycles.html

Information on business cycle expansions and contractions determined by the National Bureau of Economic Research (NBER).

www.economist.com

Web page of the weekly news magazine *The Economist*.

www.aeaweb.org/RFE/EconFAQ.html

Bill Coffe's "Resources for Economist on the Internet."

www.bea.doc.gov/bea/dn/faweb

Interactive access to fixed assets tables from the Bureau of Economic Analysis.

<http://books.nap.edu/catalog/6374.html>

William D. Nordhaus and Edward C. Kockelenberg (eds.), *Nature's Numbers: Expanding the National Economic Accounts to Include the Environment*.

<http://research.stlouisfed.org/fred2>

Federal Reserve Economic Data (FRED II) a database of over 1000 U.S. economic time series. With FRED II you can download data in Microsoft Excel and text formats and view charts of data series.

<http://economics.sbs.ohio-state.edu/jhm/jhm.html>

An up-to-date website on real and nominal interest rates.

www.bea.gov or www.bea.doc.gov

Bureau of Economic Analysis, an official source for U.S. national income accounts.

w3.access.gpo.gov/eop

The Economic Report of the President, including data tables and past issues.

www.statcan.ca/start.html or www.statcan.ca/start/_f.html

Statistics Canada, the source for Canadian data.

<http://europa.eu.int/comm/eurostat/>

European data at the Statistical Office of the European Union.

<http://database.iadb.org>

American (North and South) data provided by the Inter-American Development Bank.

www.worldbank.org/data

Data on developing countries at the World Bank website.

www.nber.org/databases/macroeconomy/contents/index.html

Pre-World War II data for several countries at the NBER website.

<http://emlab.berkeley.edu/users/chad/HallJones400.asc>

Data on workers' productivity.

<http://pwt.econ.upenn.edu>

Penn World Tables.

www.phil.frb.org

Federal Reserve Bank of Philadelphia (for Livingston Survey data).

www.bls.gov

Bureau of Labor Statistics.

www.eia.doe.gov

Energy Information Administration.

www.gallup.com

Gallup Report.

www.cbo.gov

Congressional Budget Office (CBO).

www.www.princeton.edu/~pkrugman

Paul Krugman's website.

www.whitehouse.gov/news

Council of Economic Adviser.

www.federalreserve.gov/fomc

Minutes of the Federal Open Market Committee (FOMC) meetings.

www.nobel.se/economics/laureates/199/mundell-lecture.html

Video of Robert Mundell's Nobel Prize lecture.

www.frbsf.org/currency

A picture tour of the history of American currency.

www.federalreserve.gov/FOMC/default.htm

Federal Open Market Committee (FOMC).

<http://faculty.washington.edu/karyiu/Asia/manuscri.htm>

An excellent chronology of the Asian crises.



CONTENTS

in Brief

Preface xvii

PART



INTRODUCTION AND NATIONAL INCOME ACCOUNTING 1

1. Introduction 2
2. National Income Accounting 21

PART



GROWTH, AGGREGATE SUPPLY AND DEMAND, AND POLICY 51

3. Growth and Accumulation 52
4. Growth and Policy 76
5. Aggregate Supply and Demand 94
6. Aggregate Supply: Wages, Prices, and Unemployment 111
7. The Anatomy of Inflation and Unemployment 142
8. Policy 180

PART



FIRST MODELS 213

9. Income and Spending 214
10. Money, Interest, and Income 239
11. Monetary and Fiscal Policy 268
12. International Linkages 298

PART



BEHAVIORAL FOUNDATIONS 333

- 13. Consumption and Saving 334
- 14. Investment Spending 360
- 15. The Demand for Money 390
- 16. The Fed, Money, and Credit 411
- 17. Financial Markets and Asset Prices 434

PART

BIG EVENTS, INTERNATIONAL ADJUSTMENTS, AND
ADVANCED TOPICS 451

- 18. Big Events: The Economics of Depression, Hyperinflation,
and Deficits 452
- 19. International Adjustment and Interdependence 495
- 20. Advanced Topics 538

Glossary 571

Index 593



C O N T E N T S

Preface xvii

PART



INTRODUCTION AND NATIONAL INCOME ACCOUNTING 1

1. INTRODUCTION 2

- 1-1 Macroeconomics Encapsulated in Three Models 4
- 1-2 To Reiterate ... 11
- 1-3 Outline and Preview of the Text 17
- 1-4 Prerequisites and Recipes 18

2. NATIONAL INCOME ACCOUNTING 21

- 2-1 The Production of Output and Payments to Factors of Production 22
- 2-2 Outlays and Components of Demand 25
- 2-3 Some Important Identities 30
- 2-4 Measuring Gross Domestic Product 35
- 2-5 Inflation and Price Indexes 37
- 2-6 Unemployment 42
- 2-7 Interest Rates and Real Interest Rates 43
- 2-8 Exchange Rates 45
- 2-9 Where to Grab a Look at the Data 46

PART



GROWTH, AGGREGATE SUPPLY AND DEMAND, AND POLICY 51

3. GROWTH AND ACCUMULATION 52

- 3-1 Growth Accounting 54
- 3-2 Empirical Estimates of Growth 57
- 3-3 Growth Theory: The Neoclassical Model 61

4. GROWTH AND POLICY 76

- 4-1 Growth Theory: Endogenous Growth 77
- 4-2 Growth Policy 85

5.	AGGREGATE SUPPLY AND DEMAND	94
5-1	The Aggregate Supply Curve	98
5-2	The Aggregate Demand Curve	101
5-3	Aggregate Demand Policy under Alternative Supply Assumptions	103
5-4	Supply-Side Economics	106
5-5	Putting Aggregate Supply and Demand Together in the Long Run	108
6.	AGGREGATE SUPPLY: WAGES, PRICES, AND UNEMPLOYMENT	111
6-1	The Aggregate Supply Curve and the Price Adjustment Mechanism	112
6-2	Inflation and Unemployment	116
6-3	Stagflation, Expected Inflation, and the Inflation-Expectations-Augmented Phillips Curve	120
6-4	The Rational Expectations Revolution	124
6-5	The Wage-Unemployment Relationship: Why Are Wages Sticky?	126
6-6	From Phillips Curve to the Aggregate Supply Curve	131
6-7	Supply Shocks	134
7.	THE ANATOMY OF INFLATION AND UNEMPLOYMENT	142
7-1	Unemployment	145
7-2	Inflation	146
7-3	The Anatomy of Unemployment	147
7-4	Full Employment	152
7-5	The Costs of Unemployment	161
7-6	The Costs of Inflation	162
7-7	Inflation and Indexation: Inflation-Proofing the Economy	168
7-8	Is a Little Inflation Good for the Economy?	171
7-9	Political Business Cycle Theory	172
8.	POLICY	180
8-1	Policy: Working Backward	181
8-2	Lags in the Effects of Policy	182
8-3	Expectations and Reactions	188
8-4	Uncertainty and Economic Policy	191
8-5	Targets, Instruments, and Indicators: A Taxonomy	194
8-6	Activist Policy	195
8-7	Which Target?—A Practical Application	201
8-8	Dynamic Inconsistency and Rules versus Discretion	203

PART



FIRST MODELS 213

9.	INCOME AND SPENDING	214
9-1	Aggregate Demand and Equilibrium Output	215
9-2	The Consumption Function and Aggregate Demand	216

- 9-3 The Multiplier 222
- 9-4 The Government Sector 225
- 9-5 The Budget 230
- 9-6 The Full-Employment Budget Surplus 233
- 10. MONEY, INTEREST, AND INCOME 239
 - 10-1 The Goods Market and the *IS* Curve 244
 - 10-2 The Money Market and the *LM* Curve 252
 - 10-3 Equilibrium in the Goods and Money Markets 259
 - 10-4 Deriving the Aggregate Demand Schedule 261
 - 10-5 A Formal Treatment of the *IS-LM* Model 263
- 11. MONETARY AND FISCAL POLICY 268
 - 11-1 Monetary Policy 270
 - 11-2 Fiscal Policy and Crowding Out 279
 - 11-3 The Composition of Output and the Policy Mix 284
 - 11-4 The Policy Mix in Action 288
- 12. INTERNATIONAL LINKAGES 298
 - 12-1 The Balance of Payments and Exchange Rates 300
 - 12-2 The Exchange Rate in the Long Run 307
 - 12-3 Trade in Goods, Market Equilibrium, and the Balance of Trade 310
 - 12-4 Capital Mobility 313
 - 12-5 The Mundell-Fleming Model: Perfect Capital Mobility under Fixed Exchange Rates 317
 - 12-6 Perfect Capital Mobility and Flexible Exchange Rates 320

PART



BEHAVIORAL FOUNDATIONS 333

- 13. CONSUMPTION AND SAVING 334
 - 13-1 The Life-Cycle-Permanent-Income Theory of Consumption and Saving 339
 - 13-2 Consumption under Uncertainty: The Modern Approach 344
 - 13-3 Further Aspects of Consumption Behavior 348
- 14. INVESTMENT SPENDING 360
 - 14-1 The Stock Demand for Capital and the Flow of Investment 364
 - 14-2 Investment Subsectors—Business Fixed, Residential, and Inventory 373
 - 14-3 Investment and Aggregate Supply 384
- 15. THE DEMAND FOR MONEY 390
 - 15-1 Components of the Money Stock 391
 - 15-2 The Functions of Money 394

- 15-3 The Demand for Money: Theory 396
- 15-4 Empirical Evidence 400
- 15-5 The Income Velocity of Money 404
- 16. THE FED, MONEY, AND CREDIT 411**
 - 16-1 Money Stock Determination: The Money Multiplier 413
 - 16-2 The Instruments of Monetary Control 416
 - 16-3 The Money Multiplier and Bank Loans 422
 - 16-4 Control of the Money Stock and Control of the Interest Rate 423
 - 16-5 Money Stock and Interest Rate Targets 424
 - 16-6 Money, Credit, and Interest Rates 427
 - 16-7 Which Targets for the Fed? 430
- 17. FINANCIAL MARKETS AND ASSET PRICES 434**
 - 17-1 Interest Rates: Long and Short Term 435
 - 17-2 The Random Walk of Stock Prices 441
 - 17-3 Exchange Rates and Interest Rates 446

PART

BIG EVENTS, INTERNATIONAL ADJUSTMENTS, AND ADVANCED TOPICS 451

- 18. BIG EVENTS: THE ECONOMICS OF DEPRESSION,
HYPERINFLATION, AND DEFICITS 452**
 - 18-1 The Great Depression: The Facts 453
 - 18-2 The Great Depression: The Issues and Ideas 458
 - 18-3 Money and Inflation in Ordinary Business Cycles 461
 - 18-4 Hyperinflation 466
 - 18-5 Deficits, Money Growth, and the Inflation Tax 474
 - 18-6 Budget Deficits: Facts and Issues 480
 - 18-7 Social Security 487
- 19. INTERNATIONAL ADJUSTMENT AND INTERDEPENDENCE 495**
 - 19-1 Adjustment under Fixed Exchange Rates 496
 - 19-2 Exchange Rate Changes and Trade Adjustment:
Empirical Issues 508
 - 19-3 The Monetary Approach to the Balance of Payments 512
 - 19-4 Flexible Exchange Rates, Money, and Prices 515
 - 19-5 Interest Differentials and Exchange Rate Expectations 521
 - 19-6 Exchange Rate Fluctuations and Interdependence 524
 - 19-7 The Choice of Exchange Rate Regimes 531
- 20. ADVANCED TOPICS 538**
 - 20-1 An Overview of the New Macroeconomics 539
 - 20-2 The Rational Expectations Revolution 544
 - 20-3 The Microeconomics of the Imperfect Information Aggregate
Supply Curve 552