NINTH EDITION

# MACROECONOMICS

N. GREGORY MANKIW

Harvard University



### **Brief Contents**

Preface x Supplemen	xiii ts and Media xxxii		
Part I Introduc	tion 1	Chapter 12	Aggregate Demand II: Applying the <i>IS-LM</i> Model 337
Chapter 1	The Science of Macroeconomics 1 The Data of Macroeconomics 17	Chapter 13	The Open Economy Revisited: The Mundell-Fleming Model and the Exchange-Rate Regime 367
Part II Classical Theory: The Economy in the Long Run 47		Chapter 14	Aggregate Supply and the Short-Run Tradeoff between Inflation and Unemployment 409
	National Income: Where It Comes	Part V	
Chamban 4	From and Where It Goes 47	Topics in Theory	Macroeconomic
Chapter 4	The Monetary System: What It Is and How It Works 81	•	A Dynamic Model of Economic
Chapter 5	Inflation: Its Causes, Effects, and	Chapter is	Fluctuations 439
Chapter 6	Social Costs 105 The Open Economy 139	Chapter 16	Understanding Consumer
Chapter 7	Unemployment and the Labor Market 183	Chapter 17	Behavior 475 The Theory of Investment 507
Part III		Part VI	
Growth <sup>-</sup>	Theory: The Economy ery Long Run 211	Topics in Policy	Macroeconomic 531
	Economic Growth I: Capital Accumulation and Population	Chapter 18	Alternative Perspectives on Stabilization Policy 531
	Growth 211	Chapter 19	Government Debt and Budget Deficits 555
Chapter 9	Economic Growth II: Technology, Empirics and Policy 241	Chapter 20	The Financial System: Opportunities and Dangers 581
	Cycle Theory: The y in the Short Run 281	Epilogue:	What We Know, What We Don't 607

Glossary 617

Index 627

**Chapter 10** Introduction to Economic

Fluctuations 281

**Chapter 11** Aggregate Demand I: Building the *IS-LM* Model 311

### Contents

Preface xxiii

Supp	lements and Media xxxii
Par	t I Introduction 1
Cha	pter 1 The Science of Macroeconomics 1
1-1	What Macroeconomists Study 1  ► CASE STUDY The Historical Performance of the U.S. Economy 3
1-2	How Economists Think 5  Theory of Model Building 6  FYI Using Functions to Express Relationships Among Variables 9  The Use of Multiple Models 10  Prices: Flexible Versus Sticky 10  Microeconomic Thinking and Macroeconomic Models 11  FYI Nobel Macroeconomists 12
1-3	How This Book Proceeds 13
Cha	pter 2 The Data of Macroeconomics 17
2-1	Measuring the Value of Economic Activity: Gross Domestic Product 18 Income, Expenditure, and the Circular Flow 18  FYI Stocks and Flows 20 Rules for Computing GDP 21 Real GDP Versus Nominal GDP 23 The GDP Deflator 25 Chain-Weighted Measures of Real GDP 25  FYI Two Arithmetic Tricks for Working with Percentage Changes 26 The Components of Expenditure 27  FYI What Is Investment? 28  CASE STUDY GDP and Its Components 28 Other Measures of Income 29 Seasonal Adjustment 31  CASE STUDY The New, Improved GDP of 2013 32
2-2	Measuring the Cost of Living: The Consumer Price Index 34

The Price of a Basket of Goods 34

Does the CPI Overstate Inflation? 36

How the CPI Compares to the GDP and PCE Deflators 35

2.4	The Household Survey 38  CASE STUDY Men, Women, and Labor-Force Participation 40  The Establishment Survey 41
2-4	Conclusion: From Economic Statistics to Economic Models 42
Par	t II Classical Theory: The Economy in the Long Run 47
Cha	pter 3 National Income: Where It Comes From and Where It Goes 47
3-1	What Determines the Total Production of Goods and Services? 49 The Factors of Production 49 The Production Function 50 The Supply of Goods and Services 50
3-2	How Is National Income Distributed to the Factors of Production? 51  Factor Prices 51  The Decisions Facing a Competitive Firm 52  The Firm's Demand for Factors 53  The Division of National Income 56  ▶ CASE STUDY The Black Death and Factor Prices 58  The Cobb-Douglas Production Function 58  ▶ CASE STUDY Labor Productivity as the Key Determinant of Real Wages 62  The Growing Gap Between Rich and Poor 63
3-3	What Determines the Demand for Goods and Services? 65  Consumption 65  Investment 67  FYI The Many Different Interest Rates 68  Government Purchases 69
3-4	What Brings the Supply and Demand for Goods and Services into Equilibrium? 69  Equilibrium in the Market for Goods and Services: The Supply and Demand for the Economy's Output 70  Equilibrium in the Financial Markets: The Supply and Demand for Loanable Funds 71  Changes in Saving: The Effects of Fiscal Policy 73  Changes in Investment Demand 74
3-5	Conclusion 76

2-3 Measuring Joblessness: The Unemployment Rate 38

### Chapter 4 The Monetary System: What It Is and How It Works 81

4-1	What Is Money? 82	
	The Functions of Money 8	2

The Types of Money 83

► CASE STUDY Money in a POW Camp 83

The Development of Fiat Money 84

- ► CASE STUDY Money and Social Conventions on the Island of Yap 84
- ► FYI Bitcoin: The Strange Case of Virtual Money 85

How the Quantity of Money Is Controlled 86

How the Quantity of Money Is Measured 86

► FYI How Do Credit Cards and Debit Cards Fit into the Monetary System? 88

#### 4-2 The Role of Banks in the Monetary System 88

100-Percent-Reserve Banking 89

Fractional-Reserve Banking 89

Bank Capital, Leverage, and Capital Requirements 91

#### 4-3 How Central Banks Influence the Money Supply 93

A Model of the Money Supply 93

The Instruments of Monetary Policy 95

► CASE STUDY Quantitative Easing and the Exploding Monetary Base 97

Problems in Monetary Control 98

► CASE STUDY Bank Failures and the Money Supply in the 1930s 99

#### 4-4 Conclusion 100

#### Chapter 5 Inflation: Its Causes, Effects, and Social Costs 105

#### 5-1 The Quantity Theory of Money 106

Transactions and the Quantity Equation 106

From Transactions to Income 108

The Money Demand Function and the Quantity Equation 108

The Assumption of Constant Velocity 109

Money, Prices, and Inflation 110

► **CASE STUDY** *Inflation and Money Growth* 111

#### 5-2 Seigniorage: The Revenue from Printing Money 113

► CASE STUDY Paying for the American Revolution 113

#### 5-3 Inflation and Interest Rates 114

Two Interest Rates: Real and Nominal 114

The Fisher Effect 115

► CASE STUDY Inflation and Nominal Interest Rates 115

Two Real Interest Rates: Ex Ante and Ex Post 117

► CASE STUDY Nominal Interest Rates in the Nineteenth Century 117

	The Nominal Interest Rate and the Demand for Money 118  The Cost of Holding Money 118
	Future Money and Current Prices 119
5-5	The Social Costs of Inflation 120
	The Layman's View and the Classical Response 120
	► CASE STUDY What Economists and the Public Say About Inflation 121
	The Costs of Expected Inflation 122
	The Costs of Unexpected Inflation 123
	CASE STUDY The Free Silver Movement, the Election of 1896, and The Wizard of Oz 124
	One Benefit of Inflation 125
5-6	Hyperinflation 126
	The Costs of Hyperinflation 126
	The Causes of Hyperinflation 127
	CASE STUDY Hyperinflation in Interwar Germany 128
	CASE STUDY Hyperinflation in Zimbabwe 130
5-7	
	,
App	endix The Cagan Model: How Current and Future Money Affect the Price Level 135
Cha	pter 6 The Open Economy 139
6-1	
0 1	The International Flows of Capital and Goods 140
0 1	The Role of Net Exports 141
0 1	•
0 1	The Role of Net Exports 141
0 1	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154
	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155 Nominal and Real Exchange Rates 155
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155 Nominal and Real Exchange Rates 155 The Real Exchange Rate and the Trade Balance 157
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155 Nominal and Real Exchange Rates 155 The Real Exchange Rate and the Trade Balance 157 The Determinants of the Real Exchange Rate 157
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155 Nominal and Real Exchange Rates 155 The Real Exchange Rate and the Trade Balance 157 The Determinants of the Real Exchange Rate 159 How Policies Influence the Real Exchange Rate 159
6-2	The Role of Net Exports 141 International Capital Flows and the Trade Balance 142 International Flows of Goods and Capital: An Example 144 The Irrelevance of Bilateral Trade Balances 145 Saving and Investment in a Small Open Economy 145 Capital Mobility and the World Interest Rate 146 Why Assume a Small Open Economy? 146 The Model 147 How Policies Influence the Trade Balance 148 Evaluating Economic Policy 150  CASE STUDY The U.S. Trade Deficit 152  CASE STUDY Why Doesn't Capital Flow to Poor Countries? 154 Exchange Rates 155 Nominal and Real Exchange Rates 155 The Real Exchange Rate and the Trade Balance 157 The Determinants of the Real Exchange Rate 157

	CASE STUDY The Big Mac Around the World 166
6-4	Conclusion: The United States as a Large Open Economy 168
Appe	endix The Large Open Economy 173
Chap	oter 7 Unemployment and the Labor Market 183
7-1 7-2 7-3	Job Loss, Job Finding, and the Natural Rate of Unemployment 184  Job Search and Frictional Unemployment 187  Causes of Frictional Unemployment 187  Public Policy and Frictional Unemployment 188  CASE STUDY Unemployment Insurance and the Rate of Job Finding 189  Real-Wage Rigidity and Structural Unemployment 189  Minimum-Wage Laws 190
	► CASE STUDY The Characteristics of Minimum-Wage Workers 192 Unions and Collective Bargaining 193 Efficiency Wages 194 ► CASE STUDY Henry Ford's \$5 Workday 195
7-4	Labor-Market Experience: The United States 196  The Duration of Unemployment 196  ▶ CASE STUDY The Increase in U.S. Long-Term Unemployment and the Debate Over Unemployment Insurance 197  Variation in the Unemployment Rate Across Demographic Groups 199  Transitions Into and Out of the Labor Force 199  ▶ CASE STUDY The Decline in Labor-Force Participation: 2007 to 2014 201
7-5	Labor-Market Experience: Europe 203  The Rise in European Unemployment 203  Unemployment Variation Within Europe 204  The Rise of European Leisure 205
7-6	Conclusion 207

The Special Case of Purchasing-Power Parity 165

# Part III Growth Theory: The Economy in the Very Long Run 211

## Chapter 8 Economic Growth I: Capital Accumulation and Population Growth 211

8-1 The Accumulation of Capital 212

The Supply and Demand for Goods 212

Growth in the Capital Stock and the Steady State 215

	Approaching the Steady State: A Numerical Example 217
	► CASE STUDY The Miracle of Japanese and German Growth 219
	How Saving Affects Growth 220
	► CASE STUDY Saving and Investment Around the World 222
8-2	The Golden Rule Level of Capital 223
	Comparing Steady States 224
	Finding the Golden Rule Steady State: A Numerical Example 227
	The Transition to the Golden Rule Steady State 228
8-3	Population Growth 231
	The Steady State With Population Growth 231
	The Effects of Population Growth 233
	► CASE STUDY Population Growth Around the World 234
	Alternative Perspectives on Population Growth 235
8-4	Conclusion 237
Cl	otan O. Farancia Consulta III. Tanka alama Faraisian and
Cha	pter 9 Economic Growth II: Technology, Empirics, and Policy 241
9-1	Technological Progress in the Solow Model 242
	The Efficiency of Labor 242
	The Steady State With Technological Progress 243
	The Effects of Technological Progress 244
9-2	From Growth Theory to Growth Empirics 245
	Balanced Growth 246
	► FYI Economic Possibilities for Our Grandchildren 246
	Convergence 247
	Factor Accumulation Versus Production Efficiency 249
	► CASE STUDY Good Management as a Source of Productivity 249
9-3	Policies to Promote Growth 251
	Evaluating the Rate of Saving 251
	Changing the Rate of Saving 253
	Allocating the Economy's Investment 253
	► CASE STUDY Industrial Policy in Practice 255
	Establishing the Right Institutions 256
	► CASE STUDY The Colonial Origins of Modern Institutions 257
	Encouraging Technological Progress 258
	► CASE STUDY Is Free Trade Good for Economic Growth? 259
9-4	Beyond the Solow Model: Endogenous Growth Theory 260
	The Basic Model 261
	A Two-Sector Model 262
	The Microeconomics of Research and Development 263
_	The Process of Creative Destruction 264
9-5	Conclusion 266

# Part IV Business Cycle Theory: The Economy in the Short Run 281

#### Chapter 10 Introduction to Economic Fluctuations 281

#### 10-1 The Facts About the Business Cycle 282

GDP and Its Components 282

Unemployment and Okun's Law 284

Leading Economic Indicators 287

#### 10-2 Time Horizons in Macroeconomics 289

How the Short Run and the Long Run Differ 289

► CASE STUDY If You Want to Know Why Firms Have Sticky Prices, Ask Them 290

The Model of Aggregate Supply and Aggregate Demand 292

#### 10-3 Aggregate Demand 293

The Quantity Equation as Aggregate Demand 293

Why the Aggregate Demand Curve Slopes Downward 294

Shifts in the Aggregate Demand Curve 295

#### 10-4 Aggregate Supply 296

The Long Run: The Vertical Aggregate Supply Curve 296

The Short Run: The Horizontal Aggregate Supply Curve 296

From the Short Run to the Long Run 299

- ► CASE STUDY A Monetary Lesson from French History 300
- ► **FYI** David Hume on the Real Effects of Money 301

#### 10-5 Stabilization Policy 302

Shocks to Aggregate Demand 302

Shocks to Aggregate Supply 303

 CASE STUDY How OPEC Helped Cause Stagflation in the 1970s and Euphoria in the 1980s 305

10-6 Conclusion 307

#### Chapter 11 Aggregate Demand I: Building the IS-LM Model 311

#### 11-1 The Goods Market and the IS Curve 313

The Keynesian Cross 313

- ► CASE STUDY Cutting Taxes to Stimulate the Economy: The Kennedy and Bush Tax Cuts 320
- ► CASE STUDY Increasing Government Purchases to Stimulate the Economy: The Obama Stimulus 321
- ► CASE STUDY Using Regional Data to Estimate Multipliers 322

The Interest Rate, Investment, and the IS Curve 324

How Fiscal Policy Shifts the IS Curve 326

#### 11-2 The Money Market and the LM Curve 327

The Theory of Liquidity Preference 327

► CASE STUDY Does a Monetary Tightening Raise or Lower Interest Rates? 330

	Income, Money Demand, and the LM Curve 330
	How Monetary Policy Shifts the <i>LM</i> Curve 332
11-3	Conclusion: The Short-Run Equilibrium 333
Cha	pter 12 Aggregate Demand II: Applying the <i>IS-LM</i> Model 337
12-1	Explaining Fluctuations With the IS-LM Model 338
	How Fiscal Policy Shifts the <i>IS</i> Curve and Changes the Short-Run Equilibrium 338
	How Monetary Policy Shifts the <i>LM</i> Curve and Changes the Short-Run Equilibrium 340
	The Interaction Between Monetary and Fiscal Policy 341
	Shocks in the IS-LM Model 343
	► CASE STUDY The U.S. Recession of 2001 344
	What Is the Fed's Policy Instrument—The Money Supply or the Interest Rate? 345
12-2	IS-LM as a Theory of Aggregate Demand 346
	From the IS-LM Model to the Aggregate Demand Curve 347
	The IS-LM Model in the Short Run and Long Run 349
12-3	The Great Depression 351
	The Spending Hypothesis: Shocks to the <i>IS</i> Curve 351
	The Money Hypothesis: A Shock to the <i>LM</i> Curve 353
	The Money Hypothesis Again: The Effects of Falling Prices 354
	Could the Depression Happen Again? 356
	► CASE STUDY The Financial Crisis and Great Recession of 2008 and 2009 357
	The Liquidity Trap (Also Known as the Zero Lower Bound) 360
12-4	Conclusion 361
Cha	pter 13 The Open Economy Revisited: The Mundell-Fleming Model and the Exchange-Rate Regime 367
13-1	The Mundell-Fleming Model 369
	The Key Assumption: Small Open Economy With Perfect Capital Mobility 369
	The Goods Market and the IS* Curve 370
	The Money Market and the LM* Curve 370
	Putting the Pieces Together 372
13-2	The Small Open Economy Under Floating Exchange Rates 373
	Fiscal Policy 374
	Monetary Policy 375
	Trade Policy 376
13-3	The Small Open Economy Under Fixed Exchange Rates 377
	How a Fixed-Exchange-Rate System Works 378
	CASE STUDY The International Gold Standard 379
	Fiscal Policy 380
	,

	Monetary Policy 381
	► CASE STUDY Devaluation and the Recovery from the Great Depression 382
	Trade Policy 382
	Policy in the Mundell-Fleming Model: A Summary 383
13-4	Interest Rate Differentials 384
	Country Risk and Exchange-Rate Expectations 384
	Differentials in the Mundell-Fleming Model 385
	► CASE STUDY International Financial Crisis: Mexico 1994–1995 387
	► CASE STUDY International Financial Crisis: Asia 1997—1998 388
13-5	Should Exchange Rates Be Floating or Fixed? 389
	Pros and Cons of Different Exchange-Rate Systems 389
	► CASE STUDY The Debate Over the Euro 390
	Speculative Attacks, Currency Boards, and Dollarization 392
	The Impossible Trinity 393
	► CASE STUDY The Chinese Currency Controversy 394
13-6	From the Short Run to the Long Run: The Mundell-Fleming Model with a Changing Price Level 395
13-7	A Concluding Reminder 398
Appe	endix A Short-Run Model of the Large Open Economy 402
Chap	oter 14 Aggregate Supply and the Short-Run Tradeoff
	Between Inflation and Unemployment 409
14-1	
14-1	The Basic Theory of Aggregate Supply 410
14-1	The Basic Theory of Aggregate Supply 410 The Sticky-Price Model 411
14-1	The Basic Theory of Aggregate Supply 410 The Sticky-Price Model 411 An Alternative Theory: The Imperfect-Information Model 413
14-1	The Basic Theory of Aggregate Supply 410 The Sticky-Price Model 411 An Alternative Theory: The Imperfect-Information Model 413
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421  The Short-Run Tradeoff Between Inflation and Unemployment 423
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421  The Short-Run Tradeoff Between Inflation and Unemployment 423  FYI How Precise Are Estimates of the Natural Rate of Unemployment? 425
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421  The Short-Run Tradeoff Between Inflation and Unemployment 423  FYI How Precise Are Estimates of the Natural Rate of Unemployment? 425  Disinflation and the Sacrifice Ratio 425
	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Periving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421  The Short-Run Tradeoff Between Inflation and Unemployment? 423  FYI How Precise Are Estimates of the Natural Rate of Unemployment? 425  Disinflation and the Sacrifice Ratio 425  Rational Expectations and the Possibility of Painless Disinflation 426
14-2	The Basic Theory of Aggregate Supply 410  The Sticky-Price Model 411  An Alternative Theory: The Imperfect-Information Model 413  CASE STUDY International Differences in the Aggregate Supply Curve 415  Implications 416  Inflation, Unemployment, and the Phillips Curve 418  Deriving the Phillips Curve from the Aggregate Supply Curve 418  FYI The History of the Modern Phillips Curve 420  Adaptive Expectations and Inflation Inertia 420  Two Causes of Rising and Falling Inflation 421  CASE STUDY Inflation and Unemployment in the United States 421  The Short-Run Tradeoff Between Inflation and Unemployment 423  FYI How Precise Are Estimates of the Natural Rate of Unemployment? 425  Disinflation and the Sacrifice Ratio 425  Rational Expectations and the Possibility of Painless Disinflation 426  CASE STUDY The Sacrifice Ratio in Practice 428

#### Part V Topics in Macroeconomic Theory 439

#### Chapter 15 A Dynamic Model of Economic Fluctuations 439

#### 15-1 Elements of the Model 440

Output: The Demand for Goods and Services 440
The Real Interest Rate: The Fisher Equation 442

Inflation: The Phillips Curve 442

Expected Inflation: Adaptive Expectations 443

The Nominal Interest Rate: The Monetary-Policy Rule 444

► CASE STUDY The Taylor Rule 445

#### 15-2 Solving the Model 447

The Long-Run Equilibrium 449

The Dynamic Aggregate Supply Curve 449

The Dynamic Aggregate Demand Curve 451

The Short-Run Equilibrium 453

#### 15-3 Using the Model 454

Long-Run Growth 454

A Shock to Aggregate Supply 455

A Shock to Aggregate Demand 458

FYI The Numerical Calibration and Simulation 458

A Shift in Monetary Policy 460

#### 15-4 Two Applications: Lessons for Monetary Policy 463

The Tradeoff Between Output Variability and Inflation Variability 464

► CASE STUDY Different Mandates, Different Realities: The Fed Versus the ECB 466

The Taylor Principle 467

► CASE STUDY What Caused the Great Inflation? 470

15-5 Conclusion: Toward DSGE Models 471

#### Chapter 16 Understanding Consumer Behavior 475

#### 16-1 John Maynard Keynes and the Consumption Function 476

Keynes's Conjectures 476

The Early Empirical Successes 477

Secular Stagnation, Simon Kuznets, and the Consumption Puzzle 478

#### 16-2 Irving Fisher and Intertemporal Choice 480

The Intertemporal Budget Constraint 480

► FYI Present Value, or Why a \$1,000,000 Prize Is Worth Only \$623,000 482

Consumer Preferences 483

Optimization 484

How Changes in Income Affect Consumption 485

	Constraints on Borrowing 487
16-3	Franco Modigliani and the Life-Cycle Hypothesis 489
	The Hypothesis 490
	Implications 490
	CASE STUDY The Consumption and Saving of the Elderly 493
16-4	Milton Friedman and the Permanent-Income Hypothesis 493
	The Hypothesis 494
	Implications 495
	CASE STUDY The 1964 Tax Cut and the 1968 Tax Surcharge 496
	► CASE STUDY The Tax Rebates of 2008 496
16-5	Robert Hall and the Random-Walk Hypothesis 497
	The Hypothesis 498
	Implications 498
	Consumption? Do Predictable Changes in Income Lead to Predictable Changes in
16-6	David Laibson and the Pull of Instant Gratification 500
	► CASE STUDY How to Get People to Save More 501
16-7	Conclusion 502
Cha	pter 17 The Theory of Investment 507
17-1	Business Fixed Investment 508
	The Rental Price of Capital 509
	The Cost of Capital 510
	The Determinants of Investment 512
	Taxes and Investment 514
	► CASE STUDY Inversions and Corporate Tax Reform 515
	The Stock Market and Tobin's <i>q</i> 517
	CASE STUDY The Stock Market as an Economic Indicator 518
	Alternative Views of the Stock Market: The Efficient Markets Hypothesis Versus Keynes's Beauty Contest 519
	Financing Constraints 521
17-2	Residential Investment 522
	The Stock Equilibrium and the Flow Supply 522
	Changes in Housing Demand 523
17-3	Inventory Investment 526
	•
	Reasons for Holding Inventories 526
	•

#### **Part VI** Topics in Macroeconomic Policy 531 Chapter 18 Alternative Perspectives on Stabilization Policy 531 18-1 Should Policy Be Active or Passive? Lags in the Implementation and Effects of Policies The Difficult Job of Economic Forecasting 534 ► **CASE STUDY** Mistakes in Forecasting 535 Ignorance, Expectations, and the Lucas Critique 536 The Historical Record 537 ► CASE STUDY Is the Stabilization of the Economy a Figment of the Data? 538 ► **CASE STUDY** How Does Policy Uncertainty Affect the Economy? 18-2 Should Policy Be Conducted by Rule or by Discretion? Distrust of Policymakers and the Political Process 541 The Time Inconsistency of Discretionary Policy 542 ► CASE STUDY Alexander Hamilton Versus Time Inconsistency 544 Rules for Monetary Policy 544 ► CASE STUDY Inflation Targeting: Rule or Constrained Discretion? 545 ► CASE STUDY Central-Bank Independence 546 18-3 Conclusion: Making Policy in an Uncertain World 548 Appendix Time Inconsistency and the Tradeoff Between Inflation and Unemployment 551 Chapter 19 Government Debt and Budget Deficits 555 19-1 The Size of the Government Debt 556 ► CASE STUDY The Troubling Long-Term Outlook for Fiscal Policy 559 19-2 Problems in Measurement 560 Measurement Problem 1: Inflation 561 Measurement Problem 2: Capital Assets 561 Measurement Problem 3: Uncounted Liabilities 562 Measurement Problem 4: The Business Cycle 563 Summing Up 563 19-3 The Traditional View of Government Debt 564 FYI Taxes and Incentives 566 19-4 The Ricardian View of Government Debt 566 The Basic Logic of Ricardian Equivalence 567 Consumers and Future Taxes 568 ► CASE STUDY George H. W. Bush's Withholding Experiment 569

19-5 Other Perspectives on Government Debt 573Balanced Budgets Versus Optimal Fiscal Policy 573

FYI Ricardo on Ricardian Equivalence 572

Making a Choice 571

► CASE STUDY Why Do Parents Leave Bequests? 571

Fiscal Effects on Monetary Policy 574 Debt and the Political Process 575 International Dimensions 575 ► CASE STUDY The Benefits of Indexed Bonds 576 19-6 Conclusion 577 Chapter 20 The Financial System: Opportunities and Dangers 581 20-1 What Does the Financial System Do? 582 Financing Investment 582 Sharing Risk 583 Dealing With Asymmetric Information 584 Fostering Economic Growth 586 ► CASE STUDY Microfinance: Professor Yunus's Profound Idea 587 20-2 Financial Crises 588 The Anatomy of a Crisis 588 ► FYI The TED Spread 591 ► CASE STUDY Who Should Be Blamed for the Financial Crisis of 2008–2009? 593 Policy Responses to a Crisis 594 Policies to Prevent Crises 598 ► FYI CoCo Bonds 599 ► CASE STUDY The European Sovereign Debt Crisis 601 20-3 Conclusion 602 Epilogue What We Know, What We Don't 607 The Four Most Important Lessons of Macroeconomics 607 Lesson 1: In the long run, a country's capacity to produce goods and services determines the standard of living of its citizens. 608 Lesson 2: In the short run, aggregate demand influences the amount of goods and services that a country produces. 608 Lesson 3: In the long run, the rate of money growth determines the rate of inflation, but it does not affect the rate of unemployment. 609 Lesson 4: In the short run, policymakers who control monetary and fiscal policy face a tradeoff between inflation and unemployment. 609 The Four Most Important Unresolved Questions of Macroeconomics 610 Question 1: How should policymakers try to promote growth in the economy's natural level of output? 610 Question 2: Should policymakers try to stabilize the economy? If so, how? 611 Question 3: How costly is inflation, and how costly is reducing inflation? 613 Question 4: How big a problem are government budget deficits? 614 Conclusion 615

Glossary 617 Index 627