Contents

Media and Resources from Worth Publishers xxiii Prelude: Celebrating the Tenth Edition xxvi Preface xxvii

Part I Introduction 1

Chapter 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 as Model Building 6	
	The Use of Multiple Models 8	
	FYI Using Functions to Express Relationships Among Variables 10	
	Prices: Flexible Versus Sticky 10	
	Microeconomic Thinking and Macroeconomic Models 11	
	FYI The Early Lives of Macroeconomists 12	
1-3	How This Book Proceeds 12	
Chapter 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 Helpful Hints 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	
2-2	Measuring the Cost of Living: The Consumer Price Index 32	
	The Price of a Basket of Goods 32	

How the CPI Compares to the GDP and PCE Deflators 33 Does the CPI Overstate Inflation? 34

- 2-3 Measuring Joblessness: The Unemployment Rate 36
 The Household Survey 36
 ► CASE STUDY Men, Women, and Labor-Force Participation 38
 The Establishment Survey 39
- 2-4 Conclusion: From Economic Statistics to Economic Models 40

Part II Classical Theory: The Economy in the Long Run 45

Chapter 3 National Income: Where It Comes From and Where It Goes 45

3-1 What Determines the Total Production of Goods and Services? 47 The Factors of Production 47 The Production Function 47 The Supply of Goods and Services 48 3-2 How Is National Income Distributed to the Factors of Production? 49 Factor Prices 49 The Decisions Facing a Competitive Firm 50 The Firm's Demand for Factors 51. The Division of National Income 54 ► CASE STUDY The Black Death and Factor Prices 56 The Cobb-Douglas Production Function 56 ► CASE STUDY Labor Productivity as the Key Determinant of Real Wages 59 FYI The Growing Gap Between Rich and Poor 61 **3-3** What Determines the Demand for Goods and Services? 62 Consumption 62 Investment 63 Government Purchases 64 FYI The Many Different Interest Rates 65 What Brings the Supply and Demand for Goods and Services into 3-4 Equilibrium? 66 Equilibrium in the Market for Goods and Services: The Supply and Demand for the Economy's Output 67 Equilibrium in the Financial Markets: The Supply and Demand for Loanable Funds 68

Changes in Saving: The Effects of Fiscal Policy 70 Changes in Investment Demand 71

3-5 Conclusion 73

Chapter 4 The Monetary System: What It Is and How It Works 79

4-1 What Is Money? 80 The Functions of Money 80 The Types of Money 81 ► CASE STUDY Money in a POW Camp 81 The Development of Fiat Money 82 CASE STUDY Money and Social Conventions on the Island of Yap 82 FYI Bitcoin: The Strange Case of a Digital Money 83 How the Quantity of Money Is Controlled 84 How the Quantity of Money Is Measured 84 FYI How Do Credit Cards and Debit Cards Fit into the Monetary System? 86 4-2 The Role of Banks in the Monetary System 86 100-Percent-Reserve Banking 87 Fractional-Reserve Banking 87 Bank Capital, Leverage, and Capital Requirements 89 4-3 How Central Banks Influence the Money Supply 91 A Model of the Money Supply 91 The Instruments of Monetary Policy 93 CASE STUDY Quantitative Easing and the Exploding Monetary Base 94 Problems in Monetary Control 96 CASE STUDY Bank Failures and the Money Supply in the 1930s 96

4-4 Canclusion 98

Chapter 5 Inflation: Its Causes, Effects, and Social Costs 103

5-1 The Quantity Theory of Money 104
Transactions and the Quantity Equation 104
From Transactions to Income 106
The Money Demand Function and the Quantity Equation 106
The Assumption of Constant Velocity 107
Money, Prices, and Inflation 108
► CASE STUDY Inflation and Money Growth 109

5-2	Seigniorage: The Revenue from Printing Money 111
	► CASE STUDY Paying for the American Revolution 111
5-3	Inflation and Interest Rates 112
	Two Interest Rates: Real and Nominal 112
	The Fisher Effect 113
	► CASE STUDY Inflation and Nominal Interest Rates 113
	Two Real Interest Rates: Ex Ante and Ex Post 115
5-4	The Nominal Interest Rate and the Demand for Money 115
	The Cost of Holding Money 116
	Future Money and Current Prices 116
5-5	The Social Costs of Inflation 118
	The Layman's View and the Classical Response 118
	CASE STUDY What Economists and the Public Say About Inflation 119
	The Costs of Expected Inflation 119
	The Costs of Unexpected Inflation 121
	CASE STUDY The Free Silver Movement, the Election of 1896, and the Wizard of Oz 122
	One Benefit of Inflation 123
5-6	Hyperinflation 124
	The Costs of Hyperinflation 124
	The Causes of Hyperinflation 125
	► CASE STUDY Hyperinflation in Interwar Germany 126
	► CASE STUDY Hyperinflation in Zimbabwe 128
5-7	Conclusion: The Classical Dichotomy 129

Chapter 6 The Open Economy 135

6-1	The International Flows of Capital and Goods 136
	The Role of Net Exports 137
	International Capital Flows and the Trade Balance 137
	International Flows of Goods and Capital: An Example 139
	The Irrelevance of Bilateral Trade Balances 140
6-2	Saving and Investment in a Small Open Economy 141
	Capital Mobility and the World Interest Rate 141
	Why Assume a Small Open Economy? 142
	The Model 142
	How Policies Influence the Trade Balance 144
	Evaluating Economic Policy 146
	► CASE STUDY The U.S. Trade Deficit 147
	CASE STUDY Why Doesn't Capital Flow to Poor Countries? 149

6-3 Exchange Rates 151 Nominal and Real Exchange Rates 151 The Real Exchange Rate and the Trade Balance 153 The Determinants of the Real Exchange Rate 154 How Policies Influence the Real Exchange Rate 155 The Effects of Trade Policies 156 The Determinants of the Nominal Exchange Rate 158 CASE STUDY Inflation and Nominal Exchange Rates 159 The Special Case of Purchasing-Power Parity 160 ► CASE STUDY The Big Mac Around the World 162 Conclusion: The United States as a Large Open Economy 6-4 164 Appendix The Large Open Economy 169 Chapter 7 Unemployment and the Labor Market 179 7-1 Job Loss, Job Finding, and the Natural Rate of Unemployment 180 Job Search and Frictional Unemployment 7-2 182 Causes of Frictional Unemployment 183 Public Policy and Frictional Unemployment 183 CASE STUDY Unemployment Insurance and the Rate of Job Finding 184 Real-Wage Rigidity and Structural Unemployment 7-3 185 Minimum-Wage Laws 186 Unions and Collective Bargaining 188 Efficiency Wages 189 ► CASE STUDY Henry Ford's \$5 Workday 190 7-4 Labor-Market Experience: The United States 191 The Duration of Unemployment 191 ► CASE STUDY The Increase in U.S. Long-Term Unemployment and the Debate over Unemployment Insurance 192 Variation in the Unemployment Rate Across Demographic Groups 194 Transitions into and out of the Labor Force 195 ► CASE STUDY The Decline in Labor-Force Participation: 2007 to 2017 196 Labor-Market Experience: Europe 198 7-5 The Rise in European Unemployment 198 Unemployment Variation Within Europe 199 The Rise of European Leisure 200 Conclusion 202 7-6

Part III Growth Theory: The Economy in the Very Long Run 207

Chapter 8 Economic Growth I: Capital Accumulation and Population Growth 207

- The Accumulation of Capital 208 8-1 The Supply and Demand for Goods 209 Growth in the Capital Stock and the Steady State 211 Approaching the Steady State: A Numerical Example 213 CASE STUDY The Miracle of Japanese and German Growth 216 How Saving Affects Growth 216 8-2 The Golden Rule Level of Capital 218 Comparing Steady States 218 Finding the Golden Rule Steady State: A Numerical Example 221 The Transition to the Golden Rule Steady State 223 8-3 Population Growth 225 The Steady State with Population Growth 226 The Effects of Population Growth 227
 - ► CASE STUDY Investment and Population Growth Around the World 229

Alternative Perspectives on Population Growth 231

8-4 Conclusion 232

Chapter 9 Economic Growth II: Technology, Empirics, and Policy 237

- 9-1 Technological Progress in the Solow Model 238

 The Efficiency of Labor 238
 The Steady State with Technological Progress 239
 The Effects of Technological Progress 240

 9-2 From Growth Theory to Growth Empirics 241

 Balanced Growth 242
 Convergence 242
 Factor Accumulation Versus Production Efficiency 243
 - CASE STUDY Good Management as a Source of Productivity 244
- 9-3 Policies to Promote Growth 246
 Evaluating the Rate of Saving 246
 Changing the Rate of Saving 247
 Allocating the Economy's Investment 248
 ► CASE STUDY Industrial Policy in Practice 250

Establishing the Right Institutions 251
CASE STUDY The Colonial Origins of Modern Institutions 252
Supporting a Pro-growth Culture 253
Encouraging Technological Progress 254
CASE STUDY Is Free Trade Good for Economic Growth? 254
9-4 Beyond the Solow Model: Endogenous Growth Theory 256
The Basic Model 256
A Two-Sector Model 257
The Microeconomics of Research and Development 259
The Process of Creative Destruction 260
9-5 Conclusion 261

Appendix Accounting for the Sources of Economic Growth 266

Part IV Business Cycle Theory: The Economy in the Short Run 275

Chapter 10 Introduction to Economic Fluctuations 275

10-1	The Facts About the Business Cycle 276
	GDP and Its Components 276
	Unemployment and Okun's Law 279
	Leading Economic Indicators 281
10-2	Time Horizons in Macroeconomics 283
	How the Short Run and the Long Run Differ 283
	CASE STUDY If You Want to Know Why Firms Have Sticky Prices, Ask Them 284
	The Model of Aggregate Supply and Aggregate Demand 286
10-3	Aggregate Demand 287
	The Quantity Equation as Aggregate Demand 287
	Why the Aggregate Demand Curve Slopes Downward 288
	Shifts in the Aggregate Demand Curve 289
10-4	Aggregate Supply 290
	The Long Run: The Vertical Aggregate Supply Curve 290
	The Short Run: The Horizontal Aggregate Supply Curve 292
	From the Short Run to the Long Run 293
	► CASE STUDY A Monetary Lesson from French History 295
10-5	Stabilization Policy 296
	Shocks to Aggregate Demand 296

Shocks to Aggregate Supply 297

- CASE STUDY How OPEC Helped Cause Stagflation in the 1970s and Euphoria in the 1980s 299
- 10-6 Conclusion 301

Chapter 11 Aggregate Demand I: Building the *IS-LM* Model 305

11-1 The Goods Market and the IS Curve 307

The Keynesian Cross 307

- CASE STUDY Cutting Taxes to Stimulate the Economy: The Kennedy and Bush Tax Cuts 314
- CASE STUDY Increasing Government Purchases to Stimulate the Economy: The Obama Stimulus 315
- CASE STUDY Using Regional Data to Estimate Multipliers 316

The Interest Rate, Investment, and the IS Curve 318

How Fiscal Policy Shifts the IS Curve 320

11-2 The Money Market and the LM Curve 321

The Theory of Liquidity Preference 321

CASE STUDY Does a Monetary Tightening Raise or Lower Interest Rates? 324

Income, Money Demand, and the LM Curve 324

How Monetary Policy Shifts the LM Curve 325

11-3 Conclusion: The Short-Run Equilibrium 326

Chapter 12 Aggregate Demand II: Applying the *IS-LM* Model 333

12-1 Explaining Fluctuations with the *IS-LM* Model 334 How Fiscal Policy Shifts the IS Curve and Changes the Short-Run Equilibrium 334 How Monetary Policy Shifts the LM Curve and Changes the Short-Run Equilibrium 336 The Interaction Between Monetary and Fiscal Policy 337 Shacks in the IS-LM Model 339 > CASE STUDY The U.S. Recession of 2001 340 What Is the Fed's Policy Instrument-The Money Supply or the Interest Rate? 341 12-2 IS-LM as a Theory of Aggregate Demand 342 From the IS-LM Model to the Aggregate Demand Curve 343 The IS-LM Model in the Short Run and Long Run 345 12-3 The Great Depression 347 The Spending Hypothesis: Shocks to the IS Curve 347 The Money Hypothesis: A Shock to the LM Curve 349

The Money Hypothesis Again: The Effects of Falling Prices 350

Could the Depression Happen Again? 352

CASE STUDY The Financial Crisis and Great Recession of 2008 and 2009 353

The Liquidity Trap (Also Known as the Zero Lower Bound) 356 FYI The Curious Case of Negative Interest Rates 357

FYI The Curious Case of Negative Interest Hat

12-4 Conclusion 357

Chapter 13 The Open Economy Revisited: The Mundell-Fleming Model and the Exchange-Rate Regime 363

13-1 The Mundell-Fleming Model 365

The Key Assumption: Small Open Economy with Perfect Capital Mobility 365 The Goods Market and the *IS** Curve 365 The Money Market and the *LM** Curve 366

Putting the Pieces Together 368

13-2 The Small Open Economy Under Floating Exchange Rates 369 Fiscal Policy 370 Monetary Policy 371

Trade Policy 372

13-3 The Small Open Economy Under Fixed Exchange Rates 373 How a Fixed-Exchange-Rate System Works 374

► CASE STUDY The International Gold Standard 375 Fiscal Policy 376

Monetary Policy 377

 CASE STUDY Devaluation and the Recovery from the Great Depression 378

Trade Policy 378

Policy in the Mundell-Fleming Model: A Summary 379

13-4 Interest Rate Differentials 380

Country Risk and Exchange-Rate Expectations 380 Differentials in the Mundell-Fleming Model 381

- CASE STUDY International Financial Crisis: Mexico 1994–1995 382
- CASE STUDY International Financial Crisis: Asia 1997–1998 384

13-5 Should Exchange Rates Be Floating or Fixed? 385

Pros and Cons of Different Exchange-Rate Systems 385 CASE STUDY The Debate over the Euro 386 Speculative Attacks, Currency Boards, and Dollarization 388 The Impossible Trinity 389

► CASE STUDY The Chinese Currency Controversy 390

- 13-6 From the Short Run to the Long Run: The Mundell–Fleming Model with a Changing Price Level 390
- 13-7 A Concluding Reminder 393

Appendix A Short-Run Model of the Large Open Economy 398

Chapter 14 Aggregate Supply and the Short-Run Tradeoff Between Inflation and Unemployment 405

14-1 The Basic Theory of Aggregate Supply 406

The Sticky-Price Model 406

An Alternative Theory: The Imperfect-Information Model 408

CASE STUDY International Differences in the Aggregate Supply Curve 410

Implications 411

14-2 Inflation, Unemployment, and the Phillips Curve 413

Deriving the Phillips Curve from the Aggregate Supply Curve 414

FYI The History of the Modern Phillips Curve 415

- Adaptive Expectations and Inflation Inertia 416
- Two Causes of Rising and Falling Inflation 416
- ► CASE STUDY Inflation and Unemployment in the United States 417

The Short-Run Tradeoff Between Inflation and Unemployment 419 Disinflation and the Sacrifice Ratio 420

FYI How Precise Are Estimates of the Natural Rate of Unemployment? 421

Rational Expectations and the Possibility of Painless Disinflation 422

► CASE STUDY The Sacrifice Ratio in Practice 423

Hysteresis and the Challenge to the Natural-Rate Hypothesis 425

14-3 Conclusion 426

Appendix The Mother of All Models 431

Part V Topics in Macroeconomic Theory and Policy 435

Chapter 15 A Dynamic Model of Economic Fluctuations 435

15-1 Elements of the Model 436

Output: The Demand for Goods and Services 436 The Real Interest Rate: The Fisher Equation 438 Inflation: The Phillips Curve 438 Expected Inflation: Adaptive Expectations 439

The Nominal Interest Rate: The Monetary-Policy Rule 440 ► CASE STUDY The Taylor Rule 441 15-2 Solving the Model 443 The Long-Run Equilibrium 445 The Dynamic Aggregate Supply Curve 445 The Dynamic Aggregate Demand Curve 447 The Short-Run Equilibrium 449 15-3 Using the Model 450 Long-Run Growth 450 A Shock to Aggregate Supply 451 A Shock to Aggregate Demand 454 FYI The Numerical Calibration and Simulation 454 A Shift in Monetary Policy 457 15-4 Two Applications: Lessons for Monetary Policy 459 The Tradeoff Between Output Variability and Inflation Variability 460 ► CASE STUDY Different Mandates, Different Realities: The Fed Versus the ECB 462 The Taylor Principle 463 ► CASE STUDY What Caused the Great Inflation? 466 15-5 Conclusion: Toward DSGE Models 467 Chapter 16 Alternative Perspectives on Stabilization Policy 471 16-1 Should Policy Be Active or Passive? 472 Lags in the Implementation and Effects of Policies 472 The Difficult Job of Economic Forecasting 474 ► CASE STUDY Mistakes in Forecasting 474 Ignorance, Expectations, and the Lucas Critique 476 The Historical Record 477 CASE STUDY is the Stabilization of the Economy a Figment of the Data? 478 ► CASE STUDY How Does Policy Uncertainty Affect the Economy? 478 16-2 Should Policy Be Conducted by Rule or Discretion? 480 Distrust of Policymakers and the Political Process 481 The Time Inconsistency of Discretionary Policy 482

CASE STUDY Alexander Hamilton Versus Time Inconsistency 483

Rules for Monetary Policy 484

- CASE STUDY Inflation Targeting: Rule or Constrained Discretion? 485
- ► CASE STUDY Central-Bank independence 486

16-3 Conclusion 488

Appendix Time Inconsistency and the Tradeoff Between Inflation and Unemployment 492

Chapter 17 Government Debt and Budget Deficits 495

- 17-1 The Size of the Government Debt 496
 - CASE STUDY The Troubling Long-Term Outlook for Fiscal Policy 499
- 17-2 Measurement Problems 500

Problem 1: Inflation 500 Problem 2: Capital Assets 501 Problem 3: Uncounted Liabilities 502 Problem 4: The Business Cycle 503

- Summing Up 503
- 17-3 The Traditional View of Government Debt 504

FYI Taxes and Incentives 506

- 17-4 The Ricardian View of Government Debt 506The Basic Logic of Ricardian Equivalence 506Consumers and Future Taxes 507
 - CASE STUDY George H. W. Bush's Withholding Experiment 509

Making a Choice 510

FYI Ricardo on Ricardian Equivalence 511

- 17-5 Other Perspectives on Government Debt 512
 Balanced Budgets Versus Optimal Fiscal Policy 512
 Fiscal Effects on Monetary Policy 513
 Debt and the Political Process 514
 International Dimensions 515
- 17-6 Conclusion 515

Chapter 18 The Financial System: Opportunities and Dangers 519

- 18-1 What Does the Financial System Do? 520
 Financing Investment 520
 Sharing Risk 521
 Dealing with Asymmetric Information 522
 Fostering Economic Growth 524
- 18-2 Financial Crises 525

The Anatomy of a Crisis 525 FYI The Efficient Markets Hypothesis Versus Keynes's Beauty Contest 526 FYI The TED Spread 529 CASE STUDY Who Should Be Blamed for the Financial Crisis of 2008–2009? 531
 Policy Responses to a Crisis 532
 Policies to Prevent Crises 536
 CASE STUDY The European Sovereign Debt Crisis 539

18-3 Conclusion 540

Chapter 19 The Microfoundations of Consumption and Investment 545

19-1 What Determines Consumer Spending? 546 John Maynard Keynes and the Consumption Function 546 Franco Modigliani and the Life-Cycle Hypothesis 550 Milton Friedman and the Permanent-Income Hypothesis 553 CASE STUDY The 1964 Tax Cut and the 1968 Tax Surcharge 555 ► CASE STUDY The Tax Behates of 2008 556 Robert Hall and the Random-Walk Hypothesis 557 CASE STUDY Do Predictable Changes in Income Lead to Predictable Changes in Consumption? 558 David Laibson and the Pull of Instant Gratification 559 ► CASE STUDY How to Get People to Save More 560 The Bottom Line on Consumption 562 19-2 What Determines Investment Spending? 562 The Rental Price of Capital 563 The Cost of Capital 564 The Cost-Benefit Calculus of Investment 566 Taxes and Investment 568 The Stock Market and Tobin's a 569 ► CASE STUDY The Stock Market as an Economic Indicator 570 Financing Constraints 571 The Bottom Line on Investment 572

19-3 Conclusion: The Key Role of Expectations 573

Epilogue What We Know, What We Don't 579

The Four Most Important Lessons of Macroeconomics 579

- Lesson 1: In the long run, a country's capacity to produce goods and services determines the standard of living of its citizens. 580
- Lesson 2: In the short run, aggregate demand influences the amount of goods and services that a country produces. 580
- 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. 581
- Lesson 4: In the short run, policymakers who control monetary and fiscal policy face a tradeoff between inflation and unemployment. 581

The Four Most Important Unresolved Questions of Macroeconomics 582

Question 1: How should policymakers try to promote growth in the economy's natural level of output? 582

Question 2: Should policymakers try to stabilize the economy? If so, how? 583

Question 3: How costly is inflation, and how costly is reducing inflation? 584

Question 4: How big a problem are government budget deficits? 585 Conclusion 586

Glossary 587 Index 597