

ECONOMICS

ROGER A. ARNOLD

Thirteenth Edition

Dear Student,

Economics has a way of opening up our eyes to what we couldn't see before.

Although other subjects are capable of providing an understanding of the world, economics is special because so much of the everyday world in which you live, which includes buying and selling; getting a job and an income; paying your rent; taking out a mortgage; getting an education; and understanding economic growth, inflation, unemployment, and the ups and downs of the economy, becomes more clear once you know economics. Economics helps us to understand the everyday world. If there is such a thing as the "real world," then it is the real world to which economics addresses itself.

Economics also has the ability to answer many of our questions: What causes some nations to be rich and others poor? Why is a car's price \$35,000 instead of \$25,000? What is the efficient time to read, play tennis, or sleep? How do firms decide what quantity of a good to produce and what price to charge? What causes interest rates to rise or fall? What determines the prices you pay, the income you earn, or whether you are employed or unemployed?

Is it worth learning economics? Yes, without a doubt. But learning economics doesn't come without effort. First, you can't read an economics textbook the way you read a novel. You have to think and study while you read the text. To aid you in this endeavor, let's take a moment to tell you how this book is set up.

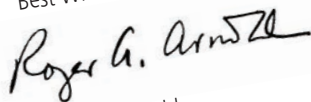
There are three major parts of the book that you should be aware of before you start to read and study. First, there is the main content of the book that includes the words and diagrams in each chapter. It is the "meat and potatoes" of the economics course. You need to read this material more than once. When it comes to learning the economics contained in the diagrams, go slowly. Look at a curve in the diagram and tell yourself what it says; each diagram tells a story. Learn to tell yourself this story as you go through each diagram.

Second, there are various boxed and stand-alone features in each chapter, such as *Economics 24/7*, *Thinking Like an Economist*, *Office Hours*, *Finding Economics*, *Hear What and How the Economist Thinks*, and *Does It Matter to You?* The features step away from the meat and potatoes of the text, and apply what has been learned. Applying what you know is an extremely important part of learning economics. Therefore, the boxed and stand-alone features are not peripheral to the main material and should not be ignored. The features are the material in different form.

Third, there are numerous instructional videos that go with this book. *Video Office Hours* takes the material in each chapter and goes over key topics, much the way your instructor might do in class. *Video Questions and Problems* addresses questions and solves problems step-by-step, and can be a valuable resource for you when working through similar assignments. *Working with Diagrams* builds, explains, and works with many of the exhibits in the text and can help you learn to tell the story of the diagram, frame by frame. *What Is Wrong With This Diagram?* helps you to learn the language of diagrams by asking you if you can figure out what is wrong with the way a particular diagram is specified.

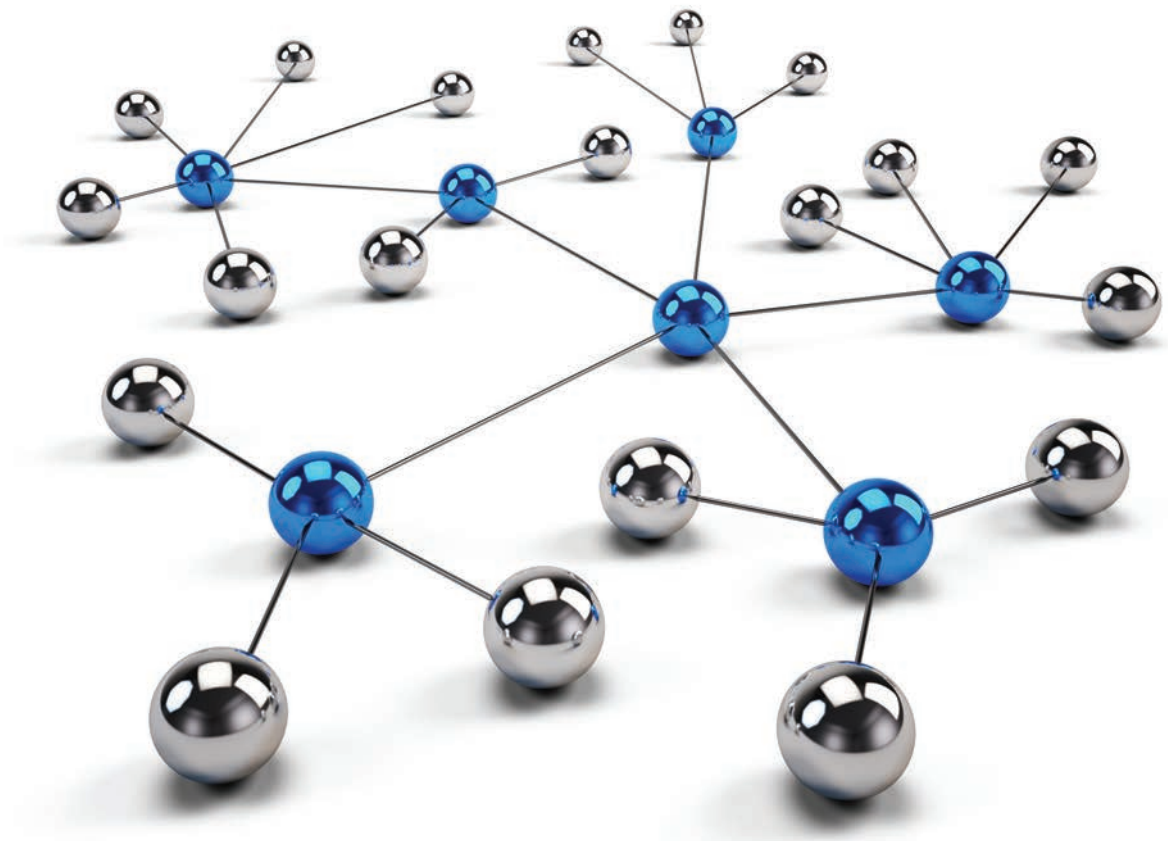
As you proceed on your economics journey, keep in mind that it takes sustained effort—and some dedicated patience—to learn economics. As you will soon find out, the effort is well worth it. The best of luck to you as you begin your study of economics.

Best Wishes,



Roger A. Arnold





ECONOMICS

Thirteenth Edition

Roger A. Arnold

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San Marcos



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To Sheila, Daniel, and David

BRIEF CONTENTS



AN INTRODUCTION TO ECONOMICS

Part 1 Economics: The Science of Scarcity

- Chapter 1** What Economics is About 1
Appendix A Working with Diagrams 25
Appendix B Should You Major in Economics? 34
Chapter 2 Production Possibilities Frontier Framework 41
Chapter 3 Supply and Demand: Theory 59
Chapter 4 Prices: Free, Controlled, and Relative 95
Chapter 5 Supply, Demand, and Price: Applications 116

MACROECONOMICS

Part 2 Macroeconomic Fundamentals

- Chapter 6** Macroeconomic Measurements, Part I: Prices and Unemployment 138
Chapter 7 Macroeconomic Measurements, Part II: GDP and Real GDP 156

Part 3 Macroeconomic Stability, Instability, and Fiscal Policy

- Chapter 8** Aggregate Demand and Aggregate Supply 181
Chapter 9 Classical Macroeconomics and the Self-Regulating Economy 215
Chapter 10 Keynesian Macroeconomics and Economic Instability: A Critique of the Self-Regulating Economy 241
Chapter 11 Fiscal Policy and the Federal Budget 274

Part 4 Money, The Economy, and Monetary Policy

- Chapter 12** Money, Banking, and the Financial System 301
Chapter 13 The Federal Reserve System 318
Appendix C The Market for Reserves (or The Federal Funds Market) 337
Chapter 14 Money and the Economy 341
Chapter 15 Monetary Policy 371
Appendix D Bond Prices and the Interest Rate 396

Part 5 Expectations and Growth

- Chapter 16** Expectations Theory and the Economy 399
Chapter 17 Economic Growth: Resources, Technology, Ideas, and Institutions 426

Part 6 Government and the Economy

- Chapter 18** Debates in Macroeconomics Over the Role and Effects of Government 443

MICROECONOMICS

Part 7 Microeconomic Fundamentals

- Chapter 19** Elasticity 459

- Chapter 20** Consumer Choice: Maximizing Utility and Behavioral Economics 489
Appendix E Budget Constraint and Indifference Curve Analysis 513
Chapter 21 Production and Costs 521

Part 8 Product Markets and Policies

- Chapter 22** Perfect Competition 555
Chapter 23 Monopoly 585
Chapter 24 Monopolistic Competition, Oligopoly, and Game Theory 608
Chapter 25 Government and Product Markets: Antitrust and Regulation 630

Part 9 Factor Markets and Related Issues

- Chapter 26** Factor Markets: With Emphasis on the Labor Market 650
Chapter 27 Wages, Unions, and Labor 675
Chapter 28 The Distribution of Income and Poverty 692
Chapter 29 Interest, Rent, and Profit 709

Part 10 Market Failure, Public Choice, and Special-Interest Group Politics

- Chapter 30** Market Failure: Externalities, Public Goods, and Asymmetric Information 729
Chapter 31 Public Choice and Special-Interest Group Politics 758

Part 11 Economic Theory-Building and Everyday Life

- Chapter 32** Building Theories to Explain Everyday Life: From Observations to Questions to Theories to Predictions 779

THE GLOBAL ECONOMY

Part 12 International Economics and Globalization

- Chapter 33** International Trade 805
Chapter 34 International Finance 824

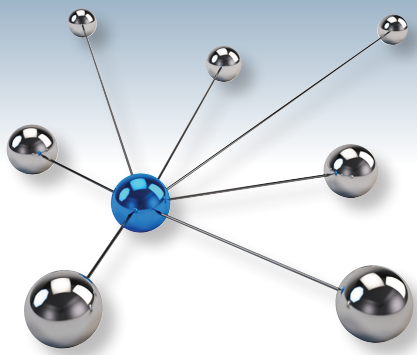
WEB CHAPTERS

- Chapter 35** The Economic Case For and Against Government: Five Topics Considered 843
Chapter 36 Stocks, Bonds, Futures, and Options 862

Self-Test Appendix 843

Glossary 869

Index 881



CONTENTS

AN INTRODUCTION TO ECONOMICS

Part 1 Economics: The Science of Scarcity

ECONOMICS 24/7

Rationing Spots at Yale 5

When Is It Too Costly to Attend College? 8

Can Incentives Make You Smarter? 12

Why Didn't I Think of That? The Case of Uber and Airbnb 15



"I Don't Believe That Every Time a Person Does Something, He Compares the Marginal Benefits and Costs" 21

CHAPTER 1: WHAT ECONOMICS IS ABOUT 1

Your Life, 2019–2029 1

A Definition of Economics 2

Goods and Bads 2 Resources 2 Scarcity and a Definition of Economics 2

Key Concepts in Economics 4

Opportunity Cost 4 Opportunity Cost and Behavior 6 Benefits and Costs 6
Decisions Made at the Margin 7 Efficiency 9

Does It Matter to You . . . If You Are Efficient or Not? 11

Economics Is About Incentives 12 Unintended Effects 13 Exchange 14

Ceteris Paribus and Theory 16

Ceteris Paribus Thinking 16 What Is a Theory? 17

Hear What and How the Economist Thinks . . . About Theories 19

Economic Categories 20

Positive Economics and Normative Economics 20 Microeconomics and
Macroeconomics 20

Chapter Summary 22

Key Terms and Concepts 23

Questions and Problems 23

Working with Numbers and Graphs 24

APPENDIX A: WORKING WITH DIAGRAMS 25

Slope of a Line 26

Slope of a Line Is Constant 27

Slope of a Curve 27

The 45-Degree Line 27

Pie Charts 29

Bar Graphs 29

Line Graphs 30

Appendix Summary 32

Key Terms and Concepts 32

Questions and Problems 32

ECONOMICS 24/7

Deducing Where Sherlock Holmes Was on His Production Possibilities Frontier? 46

Studying and Your PPF 50



“What Purpose Does the PPF Serve?” 55

ECONOMICS 24/7

What Do the Following Have in Common? Losing One’s Temper, Arriving to Class Late, and Buying the Textbook for a Class 62

Are You Buying More Than You Want to Buy? 85

“Sorry, But This Flight Has Been Overbooked” 89



“I Thought Prices Equaled Costs Plus 10 Percent” 90

APPENDIX B: SHOULD YOU MAJOR IN ECONOMICS? 34

Five Myths About Economics and Being an Economics Major 35

What Awaits You as an Economics Major? 37

What Do Economists Do? 38

Places to Find More Information 40

Concluding Remarks 40

CHAPTER 2: PRODUCTION POSSIBILITIES FRONTIER FRAMEWORK 41

The Production Possibilities Frontier 41

The Straight-Line PPF: Constant Opportunity Costs 41 The Bowed-Outward (Concave-Downward) PPF: Increasing Opportunity Costs 42

Does It Matter to You . . . *If the Economy Is at One Point on the PPF Instead of Another?* 44

Law of Increasing Opportunity Costs 45 Economic Concepts in a *Production Possibilities Frontier* Framework 46

Specialization and Trade Can Move Us Beyond Our PPF 51

A Simple Two-Person PPF Model 51 On or Beyond the PPF? 52

Hear What and How the Economist Thinks . . . *About Manufacturing Jobs* 53

Chapter Summary 56

Key Terms and Concepts 57

Questions and Problems 57

Working with Numbers and Graphs 57

CHAPTER 3: SUPPLY AND DEMAND: THEORY 59

What Is Demand? 59

The Law of Demand 60 Four Ways to Represent the Law of Demand 60 Why Does Quantity Demanded Go Down as Price Goes Up? 61 Individual Demand Curve and Market Demand Curve 62 A Change in Quantity Demanded Versus a Change in Demand 63 What Factors Cause the Demand Curve to Shift? 66 Movement Factors and Shift Factors 68

Supply 69

The Law of Supply 69 Why Most Supply Curves Are Upward Sloping 70 Changes in Supply Mean Shifts in Supply Curves 72 What Factors Cause the Supply Curve to Shift? 72 A Change in Supply Versus a Change in Quantity Supplied 74

The Market: Putting Supply and Demand Together 75

Supply and Demand at Work at an Auction 75 The Language of Supply and Demand: A Few Important Terms 76 Moving to Equilibrium: What Happens to Price When There Is a Surplus or a Shortage? 76 Speed of Moving to Equilibrium 76

Hear What and How the Economist Thinks . . . *About Higher Prices and Buying More* 78

Moving to Equilibrium: Maximum and Minimum Prices 79 The Connection Between Equilibrium and Predictions 80 Equilibrium in Terms of Consumers’ and Producers’ Surplus 81

Does It Matter to You . . . *If You Pay Equilibrium Prices or Not?* 83

What Can Change Equilibrium Price and Quantity? 83 It Is Important to Know Why the Price Changed: Back to Substitutes and Complements 86 Epilogue: Who Feeds Cleveland? 87

ECONOMICS 24/7

A Price Ceiling in the
Kidney Market 100

1973 and 1979 101

What Does Price Have to
Do with Being Late to
Class? 108

Obesity and a Soda
Tax 111



"I Thought Price Ceilings
Were Good for Consumers"
113



"Doesn't High Demand
Mean High Quantity
Demanded?" 134

Chapter Summary 91
Key Terms and Concepts 91
Questions and Problems 92
Working with Numbers and Graphs 93

CHAPTER 4: PRICES: FREE, CONTROLLED, AND RELATIVE 95

Price 95

Price as a Rationing Device 95 Price as a Transmitter of Information 96

Price Controls 97

Price Ceiling 97

Hear What and How the Economist Thinks . . . *About Price Ceilings and the Value of Money* 102

Price Floor: Definition and Effects 103

Does It Matter to You . . . *If the Demand Curve for Unskilled Labor Is Steep or Not?* 105

Two Prices: Absolute and Relative 109

Absolute (Money) Price and Relative Price 109 Taxes on Specific Goods and Relative Price Changes 110

Does It Matter to You . . . *If Something You Buy Is Taxed or Subsidized?* 112

Chapter Summary 114

Key Terms and Concepts 114

Questions and Problems 114

Working with Numbers and Graphs 115

CHAPTER 5: SUPPLY, DEMAND, AND PRICE: APPLICATIONS 116

Application 1: U-Haul Rates and Demand 116

Application 2: Subsidizing the Consumption of Anything Can Raise its Price 117

Application 3: 10 a.m. Classes in College 119

Application 4: Why Do Colleges Use GPAs, ACTs, and SATs for Purposes of Admission? 121

Application 5: Why is Medical Care So Expensive? 122

Application 6: Do You Pay for Good Weather? 124

Application 7: The Price of an Aisle Seat 126

Application 8: College Superathletes 127

Application 9: Easier-to-Obtain Loans and Higher Housing Prices 129

Application 10: Speculators, Price Variability, and Patterns 130

Application 11: Supply and Demand on a Freeway 131

Application 12: Are Renters Better Off? 132

Chapter Summary 135

Questions and Problems 136

Working with Numbers and Graphs 137

MACROECONOMICS

Part 2 Macroeconomic Fundamentals

ECONOMICS 24/7

The Beatles at Shea Stadium 144

Who Should Be Considered Unemployed? 150



“Is There More Than One Reason the Unemployment Rate Will Fall?” 153

ECONOMICS 24/7

Gross Family Product 159

No One Utters the Actual Number 159

Money and Happiness 160

1820 168



“Why Do We Use the Expenditure Approach to Measure Production?” 176

CHAPTER 6: MACROECONOMIC MEASUREMENTS, PART I: PRICES AND UNEMPLOYMENT 138

Measuring The Price Level 138

Using the CPI to Compute the Price Level 138 Inflation and the CPI 140 The Core PCE Index 141

Does It Matter to You . . . *If Prices Rise or Fall?* 142

Converting Dollars from One Year to Another 143

Hear What and How the Economist Thinks . . . *About House Prices in the Past* 145

Measuring Unemployment 146

Who Are the Unemployed? 146 The Unemployment Rate and the Employment Rate 147 Common Misconceptions about the Unemployment and Employment Rates 147 Reasons for Unemployment 148 Discouraged Workers 148 Types of Unemployment 149 The Natural Unemployment Rate and Full Employment 150 Cyclical Unemployment 151

Chapter Summary 154

Key Terms and Concepts 154

Questions and Problems 154

Working with Numbers and Graphs 155

CHAPTER 7: MACROECONOMIC MEASUREMENTS, PART II: GDP AND REAL GDP 156

Gross Domestic Product 156

Calculating GDP 156 Final Goods and Intermediate Goods 157 What GDP Omits 157 GDP Is Not Adjusted for Bads Generated in the Production of Goods 158 Per-Capita GDP 158

The Expenditure Approach to Computing GDP for a Real-World Economy 162

Using the Expenditure Approach to Compute GDP 163 Common Misconceptions about Increases in GDP 165

The Income Approach to Computing GDP for a Real-World Economy 165

Computing National Income 167 From National Income to GDP: Making Some Adjustments 168 Other National Income Accounting Measurements 170 Net Domestic Product 170 Personal Income 170 Disposable Income 170

Real GDP 171

Why We Need Real GDP 171 Computing Real GDP 171 The General Equation for Real GDP 172 What Does It Mean if Real GDP Is Higher in One Year Than in Another? 172 Real GDP, Economic Growth, and Business Cycles 172

Does It Matter to You . . . *In Which Phase of the Business Cycle You Search for a Job?* 174

Hear What and How the Economist Thinks . . . *About Economic Growth and Real GDP* 175

Chapter Summary 177

Key Terms and Concepts 178

Questions and Problems 178

Working with Numbers and Graphs 179

Part 3 Macroeconomic Stability, Instability, and Fiscal Policy

ECONOMICS 24/7

When Would You Want to Be Paid in a Currency Other Than U.S. Dollars? 195

Different Ways to Get to the Same Outcome 205

Your First Job After College May Depend on the *AD* and *SRAS* Curves 208



“What Purpose Does the *AD-AS* Framework Serve?” 210

ECONOMICS 24/7

Births, Marriage, and the Savings Rate in China 219

Unpaid Internships 230

If the Economy Is Removing Itself from a Recessionary Gap, Where Is the Declining Price Level? 236



“Do Economists Really Know What the Natural Unemployment Rate Equals?” 237

CHAPTER 8: AGGREGATE DEMAND AND AGGREGATE SUPPLY 181

A Way to View the Economy 181

Aggregate Demand 182

Why Does the Aggregate Demand Curve Slope Downward? 183 An Important Word on the Three Effects 186 A Change in Quantity Demanded of Real GDP Versus a Change in Aggregate Demand 186 Changes in Aggregate Demand: Shifts in the *AD* Curve 187 How Spending Components Affect Aggregate Demand 188 Why Is There More Total Spending? 189 Factors That Can Change *C*, *I*, *G*, and *NX* (*EX - IM*) and Therefore Can Change *AD* (Shift the *AD* Curve) 189 Can a Change in the Money Supply Change Aggregate Demand? 194 If Consumption Rises, Does Some Other Spending Component Have to Decline? 194

Does It Matter to You . . . If Velocity Falls? 196

Hear What and How the Economist Thinks . . . About Total Spending, the Money Supply, and Velocity 197

Short-Run Aggregate Supply 197

Short-Run Aggregate Supply Curve: What It Is and Why It Is Upward Sloping 197 What Puts the “Short Run” in the *SRAS* Curve? 199 Changes in Short-Run Aggregate Supply: Shifts in the *SRAS* Curve 200 Something More to Come: Peoples’ Expectations 201

Putting *AD* And *SRAS* Together: Short-Run Equilibrium 202

How Short-Run Equilibrium in the Economy Is Achieved 202 Thinking in Terms of Short-Run Equilibrium Changes in the Economy 203 An Important Exhibit 207

Long-Run Aggregate Supply 207

Going from the Short Run to the Long Run 207 Short-Run Equilibrium, Long-Run Equilibrium, and Disequilibrium 209

Chapter Summary 211

Key Terms and Concepts 212

Questions and Problems 212

Working with Numbers and Graphs 213

CHAPTER 9: CLASSICAL MACROECONOMICS AND THE SELF-REGULATING ECONOMY 215

The Classical View 215

Classical Economists and Say’s Law 215 Classical Economists and Interest Rate Flexibility 216

Does It Matter to You . . . How Much People Save? 218

Classical Economists on Prices and Wages: Both Are Flexible 219

Three States of the Economy 220

Real GDP and Natural Real GDP: Three Possibilities 220 The Labor Market and the Three States of the Economy 222 Common Misconceptions About the Unemployment Rate and the Natural Unemployment Rate 223

The Self-Regulating Economy 226

What Happens If a Self-Regulating Economy Is in a Recessionary Gap? 226 What’s the Connection Between a Slow Recovery and How Quickly or Slowly Wages Adjust? 227 What Happens If the Economy Is in an Inflationary Gap? 228 The Self-Regulating Economy: A Recap 228

ECONOMICS 24/7

The Financial and Economic Crisis of 2007–2009: Can a Housing Bust Lead to an Imploding Economy? 246

Was Keynes a Revolutionary in Economics? 249

The Economics of Spring Break 255



“Does a Lot Depend on Whether Wages Are Flexible or Inflexible?” 270

Hear What and How the Economist Thinks . . . *About Laissez-Faire and the Self-Regulating Economy* 231

Policy Implication of Believing That the Economy Is Self-Regulating 231 Changes in a Self-Regulating Economy: Short Run and Long Run 232 A Recap of Classical Macroeconomics and a Self-Regulating Economy 234 Business-Cycle Macroeconomics and Economic-Growth Macroeconomics 234

Chapter Summary 238

Key Terms and Concepts 238

Questions and Problems 239

Working with Numbers and Graphs 239

CHAPTER 10: KEYNESIAN MACROECONOMICS AND ECONOMIC INSTABILITY: A CRITIQUE OF THE SELF-REGULATING ECONOMY 241

Questioning the Classical Position and the Self-Regulating Economy 241

Keynes’s Criticism of Say’s Law in a Money Economy 242 Keynes on Wage Rates 243 Different Markets, Different Rates of Adjustment 244 Keynes on Prices 247 Is It a Question of the Time It Takes for Wages and Prices to Adjust? 248

The Simple Keynesian Model 251

Assumptions 251 The Consumption Function 251 Consumption and Saving 253 The Multiplier 254 The Multiplier and Reality 255

Does It Matter to You . . . *How Much Spring Breakers Spend, the Value of the MPC, or Both?* 256

The Simple Keynesian Model in the AD–AS Framework 257

Shifts in the Aggregate Demand Curve 257 The Keynesian Aggregate Supply Curve 257 The Economy in a Recessionary Gap 259 Government’s Role in the Economy 260 The Theme of the Simple Keynesian Model 260

Hear What and How the Economist Thinks . . . *About Why Not All Economists Agree on How the Economy Works* 261

The Simple Keynesian Model in the TE–TP Framework 262

Deriving a Total Expenditures (TE) Curve 263 Where the Consumption Curve and the Total Expenditures Curve Cut the Vertical Axis: More on Exhibit 12 264 What Will Shift the TE Curve? 265 Comparing Total Expenditures (TE) and Total Production (TP) 265 Moving from Disequilibrium to Equilibrium 266 The Economy in a Recessionary Gap and the Role of Government 268 Equilibrium in the Economy 269 The Theme of the Simple Keynesian Model 269

Chapter Summary 271

Key Terms and Concepts 271

Questions and Problems 272

Working with Numbers and Graphs 273

CHAPTER 11: FISCAL POLICY AND THE FEDERAL BUDGET 274

The Federal Budget 274

Government Expenditures 274 Government Tax Revenues 275 Budget Projections 276 Budget Deficit, Surplus, or Balance 277 Structural and Cyclical Deficits 278 The Public Debt 279 Valued-Added Tax 279 Tax Deductions Versus Subsidies 282

Fiscal Policy 283

Some Relevant Fiscal Policy Terms 283 Two Important Notes 283

ECONOMICS 24/7

Two Cab Drivers on New Year's Eve, or Turning Equal into Unequal 278

Do Voting Rules Matter to Taxing and Spending? 281



"Is There a Looming Fiscal Crisis?" 297

Demand-Side Fiscal Policy 283

Shifting the Aggregate Demand Curve 283 Fiscal Policy: Keynesian Perspective (Economy Is Not Self-Regulating) 284 Crowding Out: Questioning Expansionary Fiscal Policy 285 Lags and Fiscal Policy 287 Crowding Out, Lags, and the Effectiveness of Fiscal Policy 289 Democracy in Deficit 289

Hear What and How the Economist Thinks . . . About the Deficit as a Percentage of GDP 292**Supply-Side Fiscal Policy 292**

Marginal Tax Rates and Aggregate Supply 293 The Laffer Curve: Tax Rates and Tax Revenues 293

Does It Matter to You . . . If the Economy Is on the Upward-Sloping or Downward-Sloping Portion of the Laffer Curve? 295

Fiscal Policy and Expectations 296

Chapter Summary 298**Key Terms and Concepts 299****Questions and Problems 299****Working with Numbers and Graphs 300****Part 4 Money, the Economy, and Monetary Policy****ECONOMICS** 24/7

eBay and Dating Apps 308

Economics on the Yellow Brick Road 309



"Do We Really Need Financial Intermediaries?" 315

CHAPTER 12: MONEY, BANKING, AND THE FINANCIAL SYSTEM 301**Money: What Is It and How Did It Come To Be? 301**

Money: A Definition 301 Three Functions of Money 302 From a Barter Economy to a Money Economy: The Origins of Money 302

Does It Matter to You . . . If You Live in a Barter or Money Economy? 304

Money, Leisure, and Output 304

Defining the Money Supply 305

M1 305 Money Is More Than Currency 306 M2 306 Where Do Credit Cards Fit In? 306

Hear What and How the Economist Thinks . . . About Money and Gold 307**How Banking Developed 308**

The Early Bankers 308 The Bank's Reserves and More 310

The Financial System 311

Direct and Indirect Finance 312 Adverse Selection Problems and Moral Hazard Problems 312 The Bank's Balance Sheet 313 A Bank's Business: Turning Liabilities into Assets 313

Chapter Summary 315**Key Terms and Concepts 316****Questions and Problems 316****Working with Numbers and Graphs 317**

ECONOMICS 24/7

Inside an FOMC Meeting
320

Some History of the Fed
322



“Can Something I Do End
Up Changing the Money
Supply?” 333

ECONOMICS 24/7

The California Gold Rush,
or Really Expensive Apples
347

Grade Inflation: It’s All
Relative 356



“What Is the Current
Expected Inflation Rate?”
367

CHAPTER 13: THE FEDERAL RESERVE SYSTEM 318**The Structure and Functions of the Federal Reserve System (The Fed) 318**

The Structure of the Fed 318 Functions of the Fed 319 Common Misconceptions
About the U.S. Treasury and the Fed 321

The Money Supply Expansion Process 323

A Quick Review of Reserves, Required Reserves, and Excess Reserves 323 The Money
Supply Expansion Process 323

Hear What and How the Economist Thinks . . . About Money and Currency 327

The Money Supply Contraction Process 327

Does It Matter to You . . . If Banks Are Reserve Deficient or Not? 329**Other Fed Tools and Recent Fed Actions 329**

The Required Reserve Ratio 330 The Discount Window and the Federal Funds
Market 330 The Fed and the Federal Funds Rate Target 331 What Is Free
Banking? 331

Chapter Summary 334**Key Terms and Concepts 334****Questions and Problems 335****Working with Numbers and Graphs 335****APPENDIX C: THE MARKET FOR RESERVES (OR THE FEDERAL FUNDS MARKET) 337****The Demand for Reserves 337****The Supply of Reserves 338****Two Different Supply Curves for Reserves 338****The Corridor and Changing the Federal Funds Rate 340****CHAPTER 14: MONEY AND THE ECONOMY 341****Money and the Price Level 341**

The Equation of Exchange 341 From the Equation of Exchange to the Simple
Quantity Theory of Money 343 The Simple Quantity Theory of Money in an $AD-AS$
Framework 344

Hear What and How the Economist Thinks . . . About More Money and Inflation 346

Dropping the Assumptions that V and Q Are Constant 348

Monetarism 349

The Four Monetarist Positions 349 Monetarism and $AD-AS$ 349

Does It Matter to You . . . If the AS Curve Is Vertical or Upward-Sloping? 352

The Monetarist View of the Economy 352

Inflation 353

One-Shot Inflation 353 Continued Inflation 357 Can You Get Rid of Inflation with
Price Controls? 360

Money and Interest Rates 360

Which Economic Variables Does a Change in the Money Supply Affect? 360 The Money
Supply, the Loanable Funds Market, and Interest Rates 361 What Happens to the
Interest Rate as the Money Supply Changes? 365 The Nominal and Real Interest
Rates 366

ECONOMICS 24/7

Who Gets the Money First, and What Happens to Relative Prices? 384

Things May Not Always Go the Way the Fed Wants 385



“Does Monetary Policy Always Have the Same Effects?” 392

Chapter Summary 367
Key Terms and Concepts 368
Questions and Problems 368
Working with Numbers and Graphs 369

CHAPTER 15: MONETARY POLICY 371

Transmission Mechanisms 371

The Money Market in the Keynesian Transmission Mechanism 371 The Keynesian Transmission Mechanism: Indirect 373 The Keynesian Mechanism May Get Blocked 374 The Monetarist Transmission Mechanism: Direct 377

Monetary Policy and the Problem of Inflationary and Recessional Gaps 378

A Different View of the Economy: Patterns of Sustainable Specialization and Trade (PSST) 380

Monetary Policy and the Activist–Nonactivist Debate 381

The Case for Activist (or Discretionary) Monetary Policy 382 The Case for Nonactivist (or Rules-Based) Monetary Policy 382

Nonactivist Monetary Proposals 385

The Constant-Money-Growth-Rate Rule 386 The Predetermined-Money-Growth-Rate Rule 386 The Fed and the Taylor Rule 386 Inflation Targeting 387 Nominal GDP Targeting 387

Does It Matter to You . . . How Much of a Change There Is in the Money Supply? 388

A Gold Standard as Monetary Policy and the Value of the Dollar 389

Hear What and How the Economist Thinks . . . About Predicting Gold Prices 391

Chapter Summary 393

Key Terms and Concepts 394

Questions and Problems 394

Working with Numbers and Graphs 395

APPENDIX D: BOND PRICES AND THE INTEREST RATE 396

Appendix Summary 398

Questions and Problems 398

Part 5 Expectations and Growth

ECONOMICS 24/7

Bubbles and Expectations 409

Rational Expectations in the College Classroom 410

The Money Supply, an Increase in Productivity, and What You Think 418

CHAPTER 16: EXPECTATIONS THEORY AND THE ECONOMY 399

Phillips Curve Analysis 399

The Phillips Curve 399 Samuelson and Solow: The Americanization of the Phillips Curve 400

The Controversy Begins: Are There Really Two Phillips Curves? 401

Things Aren't Always as We Think They Are 401 Friedman and the Natural Rate Theory 401 How Do People Form Their Expectations? 405

Rational Expectations and New Classical Theory 406

Rational Expectations 406 Do People Really Anticipate Policy? 406 Price-Level Expectations and the *SRAS* Curve 407 Expected and Actual Price Levels 411 New Classical Economics and Four Different Cases 411 Comparing Exhibit 9 and 10 416



“Does New Classical Theory Call the Effects of Fiscal and Monetary Policy into Question?” 422

ECONOMICS 24/7

Thinking in Terms of Production Functions and Equations 433

Economic Freedom and Growth Rates 439



“What Is the Difference Between Business Cycle Macroeconomics and Economic Growth Macroeconomics?” 440

Does It Matter to You . . . *If the Money Supply Rises or Falls?* 417
 Hear What and How the Economist Thinks . . . *About Economists’ Predictions* 418
 New Keynesians and Rational Expectations 419
 Looking at Things from the Supply Side: Real Business Cycle Theorists 420
 Chapter Summary 423
 Key Terms and Concepts 424
 Questions and Problems 424
 Working with Numbers and Graphs 425

CHAPTER 17: ECONOMIC GROWTH: RESOURCES, TECHNOLOGY, IDEAS, AND INSTITUTIONS 426

A Few Basics About Economic Growth 426
 Do Economic Growth Rates Matter? 426
A Production Function and Economic Growth 428
 The Graphical Representation of the Production Function 428 From the Production Function to the *LRAS* Curve 430
Does It Matter to You . . . At What Rate Technology Advances? 431
 Emphasis on Labor 431 Emphasis on Capital 434 Emphasis on Other Resources: Natural Resources and Human Capital 434 Emphasis on the Technology Coefficient and Ideas 434
Hear What and How the Economist Thinks . . . About Economic Growth 435
 Discovery and Ideas 436 Expanding Our Horizons 436 Institutions Matter 437
 Chapter Summary 441
 Key Terms and Concepts 441
 Questions and Problems 442
 Working with Numbers and Graphs 442

Part 6 Government and the Economy

ECONOMICS 24/7

If It Sounds Reasonable, Is It Right? If It Sounds Unreasonable, Is It Wrong? 446

CHAPTER 18: DEBATES IN MACROECONOMICS OVER THE ROLE AND EFFECTS OF GOVERNMENT 443

Macroeconomics and Government: The Debate 443
Tax Cuts, Tax Revenue, and Budget Deficits 444
The Economy: Self-Regulating or Not? 445
More Government Spending or a Cut in Taxes: Which Gives a Bigger Bang for the Buck? 445
More Government Spending or a Cut in Taxes: The Size and Scope of Government 447
The Degree of Crowding Out 448
The Politics of Government Spending 449
Hear What and How the Economist Thinks . . . About the Economics of a Hurricane 450
Monetary Policy: Rules Versus Discretion 451
Bailouts 451



"What Kinds of Debates Do Macroeconomists Have?" 455

Demand-Side and Supply-Side Views of the Economy and Government Tools for Changing Real GDP 452

Chapter Summary 456

Key Terms and Concepts 457

Questions and Problems 457

Working with Numbers and Graphs 458

MICROECONOMICS

Part 7 Microeconomic Fundamentals

ECONOMICS 24/7

Drug Busts and Crime 466

Elasticity and the Issue of "How Much" 468

When Is a Half-Packed Auditorium Better Than a Packed One? 469

Price Elasticity of Demand and Health Care 472

Tuition Hikes at the College or University 473

House Prices and the Elasticity of Supply 480



"What Is the Relationship Between Different Price Elasticities of Demand and Total Revenue?" 485

CHAPTER 19: ELASTICITY 459

Elasticity: Part 1 459

Price Elasticity of Demand 459 Elasticity Is Not Slope 461 From Perfectly Elastic to Perfectly Inelastic Demand 461 Price Elasticity of Demand and Total Revenue (Total Expenditure) 464 Elastic Demand and Total Revenue 465

Elasticity: Part 2 470

Price Elasticity of Demand Along a Straight-Line Demand Curve 470 Determinants of Price Elasticity of Demand 471

Hear What and How the Economist Thinks . . . *About the Prevalence of Elasticity* 474

Other Elasticity Concepts 475

Cross Elasticity of Demand 475 Income Elasticity of Demand 476 Price Elasticity of Supply 477 Price Elasticity of Supply and Time 478

The Relationship Between Taxes and Elasticity 481

Who Pays the Tax? 481 Elasticity and the Tax 482

Does It Matter to You . . . *If There Are Few or Many Substitutes for the Goods You Buy?* 483

Degree of Elasticity and Tax Revenue 484

Chapter Summary 486

Key Terms and Concepts 487

Questions and Problems 487

Working with Numbers and Graphs 488

CHAPTER 20: CONSUMER CHOICE: MAXIMIZING UTILITY AND BEHAVIORAL ECONOMICS 489

Utility Theory 489

Utility: Total and Marginal 489 Law of Diminishing Marginal Utility 490 The Solution to the Diamond–Water Paradox 492

Consumer Equilibrium and Demand 494

Equating Marginal Utilities per Dollar 494 Maximizing Utility and the Law of Demand 496 Should the Government Provide the Necessities of Life for Free? 496

Hear What and How the Economist Thinks . . . *About Towns, Pollution Standards, and Making the Invisible, Visible* 498

Behavioral Economics 499

ECONOMICS 24/7

The Gym and Diminishing Marginal Utility 493

How You Pay for Good Weather 497

\$800 for Sure or \$1,000 with a Probability of 85 percent? An Experiment 500

\$40 and Two People: The Ultimatum Game 506



“Is There an Indirect Way of Proving the Law of Diminishing Marginal Utility?” 509

ECONOMICS 24/7

“He Never Showed Up” 523

High School Students, Staying Out Late, and More 534

Social Media and Marginal Cost 543

Producing a Grade in a College Course 544



“What Is the Difference Between the Law of Diminishing Marginal Returns and Diseconomies of Scale?” 551

Are People Willing to Reduce Others’ Incomes? 499 Is One Dollar Always One Dollar? 500 Coffee Mugs and the Endowment Effect 501 Does the Endowment Effect Hold Only for New Traders? 503

Does It Matter to You . . . If You Are Subject to the Endowment Effect? 503

The Ultimatum Game—and Facebook, YouTube, and Wikipedia 504 Framing 507 Neuroeconomics 508

Chapter Summary 510**Key Terms and Concepts 511****Questions and Problems 511****Working with Numbers and Graphs 512****APPENDIX E: BUDGET CONSTRAINT AND INDIFFERENCE CURVE ANALYSIS 513****The Budget Constraint 513****What Will Change the Budget Constraint? 513****Indifference Curves 514****Constructing an Indifference Curve 515****The Indifference Map and the Budget Constraint Come Together 518****From Indifference Curves to a Demand Curve 519****Appendix Summary 520****Key Terms and Concepts 520****Questions and Problems 520****CHAPTER 21: PRODUCTION AND COSTS 521****Why Firms Exist 521**

The Market and the Firm: Invisible Hand Versus Visible Hand 521 The Alchian-and-Demsetz Answer 522 Shirking on a Team 522 Ronald Coase on Why Firms Exist 523 Markets: Outside and Inside the Firm 524

Two Sides to Every Business Firm 524

More on Total Cost 525 Accounting Profit Versus Economic Profit 525

Does It Matter to You . . . If You Think in Terms of Only Accounting Profit? 526

Zero Economic Profit Is Not as Bad as It Sounds 527

Hear What and How the Economist Thinks . . . About Maximizing Revenue and Profit 528**Production 529**

Common Misconception About the Short Run and Long Run 529 Production in the Short Run 529 Whose Marginal Productivity Are We Talking About? 531 Marginal Physical Product and Marginal Cost 531 Average Productivity 534

Costs of Production: Total, Average, Marginal 536

The *AVC* and *ATC* Curves in Relation to the *MC* Curve 538 Tying Short-Run Production to Costs 541 One More Cost Concept: Sunk Cost 542

Production and Costs in the Long Run 546

Long-Run Average Total Cost Curve 547 Economies of Scale, Diseconomies of Scale, and Constant Returns to Scale 548 Why Economies of Scale? 549 Why Diseconomies of Scale? 549 Minimum Efficient Scale and Number of Firms in an Industry 549

- Shifts In Cost Curves 550**
 - Taxes 550
 - Input Prices 550
 - Technology 550
- Chapter Summary 551**
- Key Terms and Concepts 552**
- Questions and Problems 553**
- Working with Numbers and Graphs 554**

Part 8 Product Markets and Policies

ECONOMICS 24/7

The Digital Revolution, Price, and Marginal Cost 567

How Is High-Quality Land Like a Genius Software Engineer? 578



“Do You Have to Know the $MR = MC$ Condition in Order to Be Successful in Business?” 580

CHAPTER 22: PERFECT COMPETITION 555

The Theory of Perfect Competition 555

A Perfectly Competitive Firm Is a Price Taker 556 The Demand Curve for a Perfectly Competitive Firm Is Horizontal 556 Common Misconceptions about Demand Curves 557 The Marginal Revenue Curve of a Perfectly Competitive Firm Is the Same as Its Demand Curve 558 Theory and Real-World Markets 559

Perfect Competition in the Short Run 560

What Level of Output Does the Profit-Maximizing Firm Produce? 560 The Perfectly Competitive Firm and Resource Allocative Efficiency 560 To Produce or Not to Produce: That Is the Question 561 Common Misconceptions over the Shutdown Decision 564 The Perfectly Competitive Firm’s Short-Run Supply Curve 565 From Firm Supply Curve to Market (Industry) Supply Curve 565 Why Is the Market Supply Curve Upward Sloping? 568

Perfect Competition in the Long Run 568

The Conditions of Long-Run Competitive Equilibrium 569 The Perfectly Competitive Firm and Productive Efficiency 570 Industry Adjustment to an Increase in Demand 571 Profit from Two Perspectives 574

Does It Matter to You . . . If There Is Easy Entry into a Market? 575

Industry Adjustment to a Decrease in Demand 576 Differences in Costs, Differences in Profits: Now You See It, Now You Don’t 576

Hear What and How the Economist Thinks . . . About Buyers and Sellers 577

Profit and Discrimination 578

Topics for Analysis in the Theory of Perfect Competition 579

Do Higher Costs Mean Higher Prices? 579 Will the Perfectly Competitive Firm Advertise? 579 Supplier-Set Price Versus Market-Determined Price: Collusion or Competition? 580

Chapter Summary 581

Key Terms and Concepts 582

Questions and Problems 582

Working with Numbers and Graphs 583

CHAPTER 23: MONOPOLY 585

The Theory of Monopoly 585

Barriers to Entry: A Key to Understanding Monopoly 586 What Is the Difference Between a Government Monopoly and a Market Monopoly? 586

ECONOMICS 24/7

Monopoly and the Boston Tea Party 587

Religion and Monopoly 598

One for \$40 or Two for \$70 600

Do Colleges and Universities Price Discriminate? 602

Buying a Computer and Getting a Printer for \$100 Less Than the Retail Price 604



“Does the Single-Price Monopolist Lower Price Only on the Additional Unit?” 605

ECONOMICS 24/7

The People Wear Prada 612

How Is a New Year’s Resolution Like a Cartel Agreement? 617



“Are Firms (as Sellers) Price Takers or Price Searchers?” 627

Monopoly Pricing and Output Decisions 587

The Monopolist’s Demand and Marginal Revenue 588 The Monopolist’s Demand Curve and Marginal Revenue Curve Are Not the Same 589 Price and Output for a Profit-Maximizing Monopolist 589 Comparing the Demand Curve in Perfect Competition with the Demand Curve in Monopoly 591 If a Firm Maximizes Revenue, Does It Automatically Maximize Profit Too? 591

Perfect Competition and Monopoly 592

Price, Marginal Revenue, and Marginal Cost 592 Monopoly, Perfect Competition, and Consumers’ Surplus 592 Monopoly or Nothing? 594

The Case Against Monopoly 595

The Deadweight Loss of Monopoly 595

Does It Matter to You . . . If There Is a Deadweight Loss of Monopoly Triangle? 596

Rent Seeking 596 X-Inefficiency 597

Price Discrimination 598

Types of Price Discrimination 599 Why a Monopolist Wants to Price Discriminate 599 Conditions of Price Discrimination 599

Hear What and How the Economist Thinks . . . About Price Discrimination 600

Moving to $P = MC$ Through Price Discrimination 601 Coupons and Price Discrimination 603

Chapter Summary 605**Key Terms and Concepts 606****Questions and Problems 606****Working with Numbers and Graphs 607****CHAPTER 24: MONOPOLISTIC COMPETITION, OLIGOPOLY, AND GAME THEORY 608****The Theory of Monopolistic Competition 608**

The Monopolistic Competitor’s Demand Curve 609 The Relationship between Price and Marginal Revenue for a Monopolistic Competitor 609 Output, Price, and Marginal Cost for the Monopolistic Competitor 609 Will There Be Profits in the Long Run? 609 Excess Capacity: What Is It, and Is It “Good” or “Bad”? 610 The Monopolistic Competitor and Two Types of Efficiency 612

Oligopoly: Assumptions and Real-World Behavior 613

The Concentration Ratio 613

Price and Output Under the Cartel Theory 614

The Cartel Theory 614

Game Theory, Oligopoly, and Contestable Markets 617

Prisoner’s Dilemma 618 Oligopoly Firms’ Cartels and the Prisoner’s Dilemma 620 Are Markets Contestable? 621 Necessary and Sufficient Conditions and Efficiency 622

A Review of Market Structures 622**Applications of Game Theory 623**

Grades and Partying 623

Hear What and How the Economist Thinks . . . About Grade Inflation 625

The Arms Race 626 Speed Limit Laws 626

Chapter Summary 628**Key Terms and Concepts 629****Questions and Problems 629****Working with Numbers and Graphs 629**

ECONOMICS 24/7

Thomas Edison and Hollywood 632

Why It May Be Hard to Dislodge People from Facebook 637

High-Priced Ink Cartridges and Expensive Minibars 638



“What Is the Advantage of the Herfindahl Index?” 646

CHAPTER 25: GOVERNMENT AND PRODUCT MARKETS: ANTITRUST AND REGULATION 630

Antitrust 630

Antitrust Acts 631 Unsettled Points in Antitrust Policy 633 Antitrust and Mergers 635
Common Misconceptions about Antitrust Policy 636 Network Monopolies 636

Regulation 639

The Case of Natural Monopoly 639 Regulating the Natural Monopoly 641 Regulating Industries That Are Not Natural Monopolies 643 Theories of Regulation 643

Hear What and How the Economist Thinks . . . About Regulation 644

The Costs and Benefits of Regulation 645

Does It Matter to You . . . If People Are Aware of Both the Costs and the Benefits of Regulation? 645

Chapter Summary 647

Key Terms and Concepts 648

Questions and Problems 648

Working with Numbers and Graphs 649

Part 9 Factor Markets and Related Issues

ECONOMICS 24/7

Why Jobs Don't Always Move to a Low-Wage Country 658

Adam Smith's Philosopher and Street Porter 664

Who Pays the Social Security Tax? 669



“Why Do Economists Think in Twos?” 672

CHAPTER 26: FACTOR MARKETS: WITH EMPHASIS ON THE LABOR MARKET 650

Factor Markets 650

The Demand for a Factor 650 Marginal Revenue Product: Two Ways to Calculate It 651
The *MRP* Curve Is the Firm's Factor Demand Curve 651 Value Marginal Product 652
An Important Question: Is $MRP = VMP$? 653 Marginal Factor Cost: The Firm's Factor Supply Curve 654
How Many Units of a Factor Should a Firm Buy? 655 When There Is More Than One Factor, How Much of Each Factor Should the Firm Buy? 655

The Labor Market 657

Shifts in a Firm's *MRP*, or Factor Demand, Curve 657 Market Demand for Labor 659
The Elasticity of Demand for Labor 660

Hear What and How the Economist Thinks . . . About the Debate Over the Minimum Wage 660

Does It Matter to You . . . If the Elasticity of Demand for the Good or Service You Produce Is High or Low? 662

Market Supply of Labor 662 An Individual's Supply of Labor 663 Shifts in the Labor Supply Curve 664
Putting Supply and Demand Together 665 Why Do Wage Rates Differ? 666
Why Demand and Supply Differ among Labor Markets 667 Why Did You Choose Your Major? 667 Marginal Productivity Theory 668

Labor Markets and Information 670

Screening Potential Employees 670 Promoting from Within 671 Discrimination or an Information Problem? 671

Chapter Summary 672

Key Terms and Concepts 673

Questions and Problems 673

Working with Numbers and Graphs 674

ECONOMICS 24/7

Technology, the Price of Competing Factors, and Displaced Workers 681

Are You Ready for Some Football? 687



“Don’t Higher Wages Reduce Profits?” 689

ECONOMICS 24/7

Statistics Can Mislead If You Don’t Know How They Are Made 696



“Are the Number of Persons in Each Fifth the Same?” 706

ECONOMICS 24/7

Is the Car Worth Buying? 715

Investment, Present Value, and Interest Rates 715

Grain Prices and Land Rent 717

CHAPTER 27: WAGES, UNIONS, AND LABOR 675**Objectives of Labor Unions 675**

Employment for All Members 675 Maximizing the Total Wage Bill 676 Maximizing Income for a Limited Number of Union Members 676 Wage–Employment Trade-Off 676

Practices of Labor Unions 677

Affecting the Elasticity of Demand for Union Labor 677

Hear What and How the Economist Thinks . . . About Unions and Wages 678

Affecting the Demand for Union Labor 679 Affecting the Supply of Union Labor 679 Affecting Wages Directly: Collective Bargaining 680 Strikes 682

Effects of Labor Unions 682

The Case of Monopsony 682 Unions’ Effects on Wages 684

Does It Matter to You . . . If Things Are Different in the Short-Run Than in the Long Run? 686

Unions’ Effects on Prices 686 Unions’ Effects on Productivity and Efficiency: Two Views 686

Chapter Summary 689**Key Terms and Concepts 690****Questions and Problems 690****Working with Numbers and Graphs 691****CHAPTER 28: THE DISTRIBUTION OF INCOME AND POVERTY 692****Some Facts About Income Distribution 692**

Who Are the Rich and How Rich Are They? 692 The Effect of Age on the Income Distribution 693 A Simple Equation 695

Does It Matter to You . . . What Your Educational Attainment Level Is? 697**Measuring Income Equality 697**

The Lorenz Curve 697 The Gini Coefficient 699 A Limitation of the Gini Coefficient 700 Common Misconceptions about Income Inequality 700

Why Income Inequality Exists 701

Factors Contributing to Income Inequality 702 Income Differences: Some Are Voluntary, Some Are Not 703

Poverty 704

What Is Poverty? 704 Limitations of the Official Poverty Income Statistics 704 Who Are the Poor? 705 What Is the Justification for Government Redistributing Income? 705

Chapter Summary 707**Key Terms and Concepts 708****Questions and Problems 708****Working with Numbers and Graphs 708****CHAPTER 29: INTEREST, RENT, AND PROFIT 709****Interest 709**

Loanable Funds: Demand and Supply 709 The Price for Loanable Funds and the Return on Capital Goods Tend to Equality 711 Why Do Interest Rates Differ? 712 Nominal and Real Interest Rates 712 Present Value: What Is Something Tomorrow Worth Today? 713 Rent 716 David Ricardo, the Price of Grain, and Land Rent 716 The Supply Curve of Land Can Be Upward Sloping 718 Economic Rent and Other Factors of Production 719 Economic Rent and Baseball Players: Perspective Matters 719



"How Is Present Value Used in the Courtroom?" 726

Does It Matter to You . . . If People Compete for Artificial Rents as Opposed to Real Rents? 720

Competing for Artificial and Real Rents 720

Profit 721

Theories of Profit 721 Profit and Loss as Signals 722

Hear What and How the Economist Thinks . . . About Profit 723

The Entrepreneur 724

A Market 724 How Can the Entrepreneur Increase Trade? 724 Turning Potential Trades into Actual Trades 725 A Necessary Condition: Turn Potential Trades into Actual Trades in a Way Acceptable to Consumers 725 Can Increasing Trades in One Area Reduce Trades in Another? 725 Uncertainty and the Entrepreneur 725

Chapter Summary 727

Key Terms and Concepts 727

Questions and Problems 728

Working with Numbers and Graphs 728

Part 10 Market Failure, Public Choice, and Special-Interest Group Politics

ECONOMICS 24/7

An Unintended Effect of Social Media 733

Tribes, Transaction Costs, and Social Media 739

"They Paved Paradise and Put Up a Parking Lot" 747

Arriving Late to Class, Grading on a Curve, and Studying Together for the Midterm 752



"Doesn't It Seem Wrong to Let Some Business Firms Pay to Pollute?" 753

CHAPTER 30: MARKET FAILURE: EXTERNALITIES, PUBLIC GOODS, AND ASYMMETRIC INFORMATION 729

Externalities 729

Costs and Benefits of Activities 729 Marginal Costs and Benefits of Activities 730 Social Optimality, or Efficiency, Conditions 731 Three Categories of Activities 731 Externalities in Consumption and in Production 731 Diagram of a Negative Externality 731 Diagram of a Positive Externality 734

Internalizing Externalities 735

Persuasion 735 Taxes and Subsidies 736 Assigning Property Rights 736

Hear What and How the Economist Thinks . . . About Coming to Class Late 737

Voluntary Agreements 737 Combining Property Rights Assignments and Voluntary Agreements 738 Beyond Internalizing: Setting Regulations 739

Environmental Policy 740

Method 1: Government Regulation, or Command and Control 741 Method 2: Emission Taxes 741 Method 3: Tradable Pollution Permits (Cap and Trade) 742 Similarities and Differences Between Emission Taxes and Tradable Pollution Permits 743

Public Goods: Excludable and Nonexcludable 744

Goods 744 The Free Rider 745

Does It Matter to You . . . If There Is a Free-Rider Problem? 746

Nonexcludable Versus Nonrivalrous 746

Asymmetric Information 748

Asymmetric Information in a Product Market 748 Asymmetric Information in a Factor Market 749 Is There Market Failure? 749 Adverse Selection 750 Moral Hazard 751

Chapter Summary 754

Key Terms and Concepts 755

Questions and Problems 756

Working with Numbers and Graphs 757

ECONOMICS 24/7

A Simple-Majority Voting Rule:
The Case of the Statue in the
Public Square 761

Economic Illiteracy and
Democracy 765



“Doesn’t Public Choice Paint
a Bleak Picture of Politics
and Government?” 775

**CHAPTER 31: PUBLIC CHOICE AND SPECIAL-INTEREST
GROUP POLITICS 758**

Public Choice Theory 758

The Political Market 759

Moving Toward the Middle: The Median Voter Model 759 What Does the Theory
Predict? 760

Voters and Rational Ignorance 763

The Costs and Benefits of Voting 763

Does It Matter to You . . . If You Do Not Vote? 764

Rational Ignorance 764

Hear What and How the Economist Thinks . . . About Rational Ignorance 766

More About Voting 767

Example 1: Voting for a Nonexcludable Public Good 767 Example 2: Voting and
Efficiency 768

Special-Interest Groups 769

Information and Lobbying 769 Congressional Districts as Special-Interest Groups 770

Public-Interest Talk, Special-Interest Legislation 770 Rent Seeking 771 Bringing About
Transfers 772 Information, Rational Ignorance, and Seeking Transfers 772

Constitutional Economics 774

Chapter Summary 776

Key Terms and Concepts 777

Questions and Problems 777

Working with Numbers and Graphs 778

Part 11 Economic Theory-Building and Everyday Life**ECONOMICS** 24/7

Can Social Media Affect
Whom a Person Dates?
785

Talking on a Cell Phone
in Public 794



“Can Anyone Build
a Theory?” 802

**CHAPTER 32: BUILDING THEORIES TO EXPLAIN EVERYDAY LIFE: FROM
OBSERVATIONS TO QUESTIONS TO THEORIES TO PREDICTIONS 779**

A Different Kind of Chapter 779

The Process 780

Observation/Thought 1: The Birthrates in Various Countries are Different 781

The Question 781 The Theory 781 The Predictions 781

A Detour: The Issue of Falsifiability (Refutability) 782

Hear What and How the Economist Thinks . . . About Theories 782

**Observation/Thought 2: The Ethical Code of People Who Live in a Small Town is
Different from that of People Who Live in a Large City 783**

The Question 784 The Theory 784 The Predictions 784

**Observation/Thought 3: The Closer the Dollar Tuition the Student Pays is to the
Equilibrium Tuition, the More on Time and Responsive University Instructors Will Be for
Office Hours 786**

The Question 786 The Theory 786 The Predictions 788

Observation/Thought 4: Criminals Are Not Rational 788

The Question 788 The Theory 788 The Predictions 789 A Detour: Does

Evidence Prove a Theory Correct? 789 Another Detour: After You Have One Theory

That Explains and Predicts, Search for Another 790 A Final Detour: Why Prediction Is
So Important, Or Why Good-Sounding Stories Are Not Enough 791

Observation/Thought 5: More Students Wear Baseball Caps in Class on Exam Days Than on Other Days 792

The Question 792 The Theory 792 The Predictions 793

Observation/Thought 6: Houses in “Good” School Districts Are Often More Expensive than Comparable Houses in “Bad” School Districts 795

The Question 795 The Theory 795 The Predictions 795

Observation/Thought 7: Are People Better Off With or Without Health Care Vouchers? 796

The Question 796 The Theory 796 The Predictions 797

Observation/Thought 8: People Who Give to Others Often Complain That They End Up Giving Too Much 797

The Question 797 The Theory 798 The Predictions 800

Does It Matter to You . . . *If and How You Are in Someone Else’s Utility Function?* 801

Chapter Summary 802

Questions and Problems 804

Working with Numbers and Graphs 804

THE GLOBAL ECONOMY

Part 12 International Economics and Globalization

ECONOMICS 24/7

Dividing the Work 810

Offshore Outsourcing,
or Offshoring 818



“Should We Impose Tariffs if They Impose Tariffs?” 820

ECONOMICS 24/7

The U.S. Dollar as the Primary
Reserve Currency 830

Chinese Imports and the
U.S. Economy 833

CHAPTER 33: INTERNATIONAL TRADE 805

International Trade Theory 805

How Countries Know What to Trade 806

Does It Matter to You . . . *If There Is Always Someone Who Can Do Something Better Than You?* 808

A Common Misconception about How Much We Can Consume 809 How Countries Know When They Have a Comparative Advantage 809

Hear What and How the Economist Thinks . . . *About Common Sense* 811

Trade Restrictions 811

The Distributional Effects of International Trade 812 Consumers’ and Producers’ Surpluses 812 The Benefits and Costs of Trade Restrictions 813 Why Nations Sometimes Restrict Trade 817

Chapter Summary 821

Key Terms and Concepts 822

Questions and Problems 822

Working with Numbers and Graphs 823

CHAPTER 34: INTERNATIONAL FINANCE 824

The Foreign Exchange Market 824

The Demand for Goods 825 The Demand for, and Supply of, Currencies 825

Flexible Exchange Rates 826

The Equilibrium Exchange Rate 826



“Why Is the Depreciation of One Currency Tied to the Appreciation of Another?” 839

Does It Matter to You . . . If the Dollar Depreciates? 827

Changes in the Equilibrium Exchange Rate 827 Factors That Affect the Equilibrium Exchange Rate 828

Fixed Exchange Rates 831

Fixed Exchange Rates and Overvalued or Undervalued Currency 832 What Is So Bad about an Overvalued Dollar? 834 Government Involvement in a Fixed Exchange Rate System 835 Options Under a Fixed Exchange Rate System 835

Fixed Exchange Rates Versus Flexible Exchange Rates 837

Promoting International Trade 837 Optimal Currency Areas 837

Chapter Summary 840

Key Terms and Concepts 841

Questions and Problems 841

Working with Numbers and Graphs 842

WEB CHAPTERS

ECONOMICS 24/7

Culture as a Public Good 850



“I’m No Longer Sure What I Think” 859

CHAPTER 35: THE ECONOMIC CASE FOR AND AGAINST GOVERNMENT: FIVE TOPICS CONSIDERED 843

Economics and Government 843

The Economic Case for Government 844

Government Can Remove Individuals from a Prisoner’s Dilemma Setting 844 Externalities 848 Nonexcludable Public Goods 849 The Case for Smaller or Larger Government 851

The Economic Case Against Government 852

Unintended Effects of Government Actions 852 Government as Transfer Mechanism 853 Economic Growth Versus Transfers 855 Following the Leader in Pushing for Transfers 856 Divisive Society: A Nonexcludable Public Bad 858

Chapter Summary 859

Key Terms and Concepts 860

Questions and Problems 860

Working with Numbers and Graphs 861

ECONOMICS 24/7

Are Some Economists Poor Investors? 867

\$1.3 Quadrillion 872

CHAPTER 36: STOCKS, BONDS, FUTURES, AND OPTIONS 862

Financial Markets 862

Stocks 863

Where Are Stocks Bought and Sold? 863 The Dow Jones Industrial Average (DJIA) 864 How the Stock Market Works 865 Why Do People Buy Stock? 866 How to Buy and Sell Stock 866 Buying Stocks or Buying the Market 867 How to Read the Stock Market Page 868

Bonds 870

The Components of a Bond 870 Bond Ratings 871 Bond Prices and Yields (or Interest Rates) 871 Common Misconceptions about the Coupon Rate and Yield (Interest Rate) 872 Types of Bonds 873 How to Read the Bond Market Page 873 Risk and Return 875



"I Have Three Questions."
878

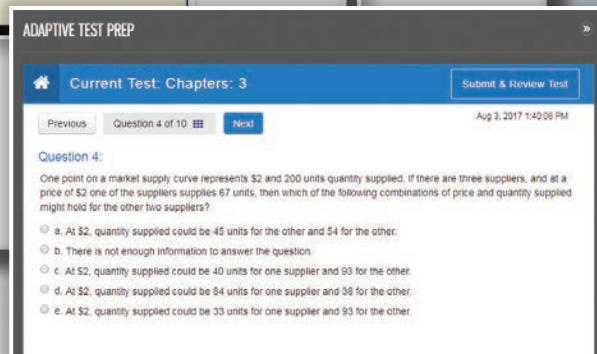
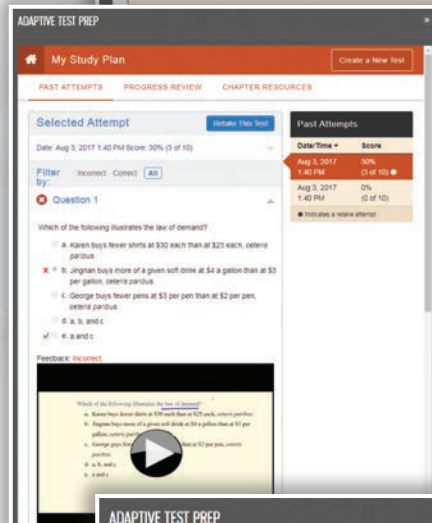
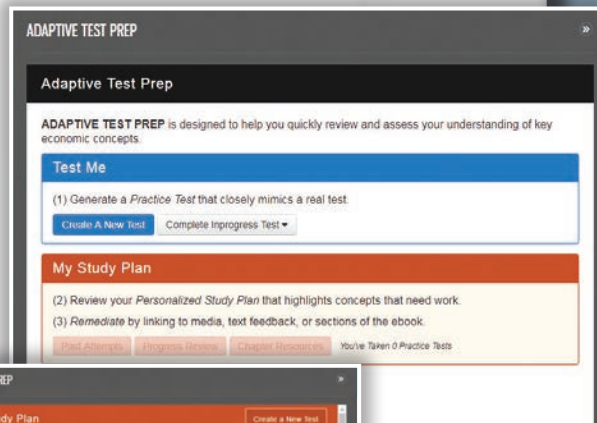
Futures and Options	875
Futures	875
Options	876
Chapter Summary	879
Key Terms and Concepts	879
Questions and Problems	879
Working with Numbers and Graphs	880
Self-Test Appendix	843
Glossary	869
Index	881

Roger Arnold's **ECONOMICS** opens up the world of economic analysis. Substantive content, detailed diagrams, popular economic features, and innovative pedagogy are just the beginning. **ECONOMICS** continues to blaze the trail for constantly updated content and applications balanced with unequaled media and study assets, including the new Adaptive Test Prep app.

Only available in MindTap®, the new Adaptive Test Prep

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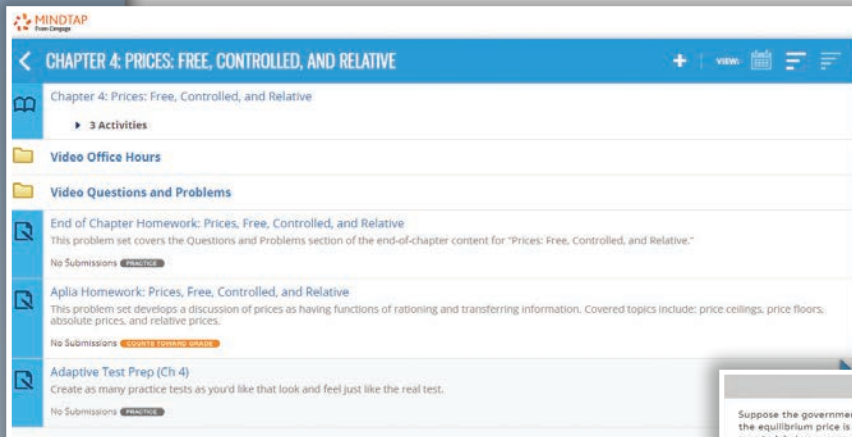




MindTap Economics 13th Edition is a personalized learning solution empowering students to analyze, apply, and improve their thinking. With MindTap,

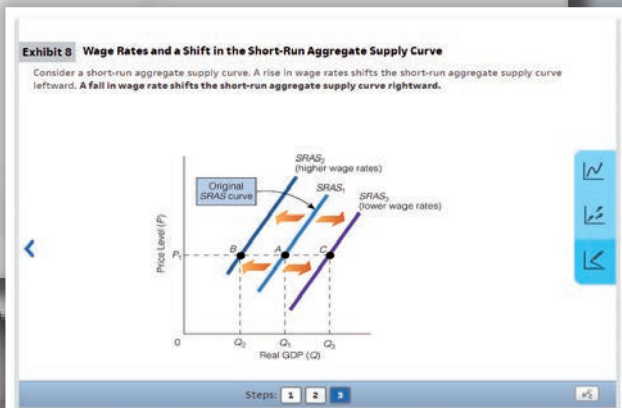
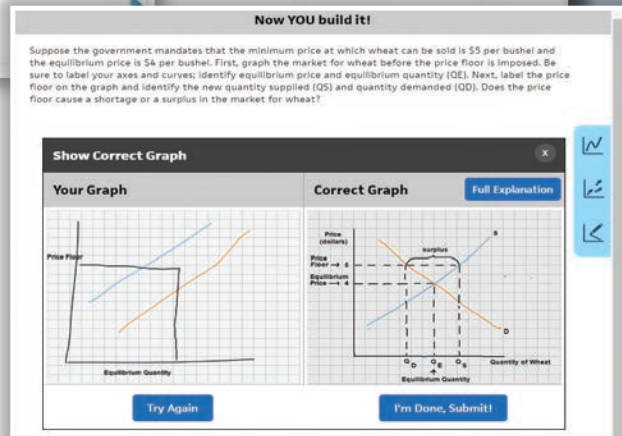
students can measure their progress and improve outcomes. Using the unique Learning Path in MindTap, students can follow prescribed steps that highlight valuable learning tools, such as readings, Talking Economics, What is Wrong With This Diagram video quizzing, Economics in 5 minutes, Problem Walk-Through

videos, End-of-Chapter practice problems, the new Adaptive Test Prep App, new Graph Builders in the eReader, ConceptClip videos, Aplia, and much more.



NEW! Graph Builder

Available in MindTap. Many economic graphs have been digitally enhanced in Arnold's eReader using our new Graph Builder technology. This feature allows students to work at their own pace in order to see a complex graph being built step-by-step. Progression Graphs decompose each graphical exhibit into several layers while still maintaining a rich, economic pedagogy.





Aplia is the most successful and widely used homework solution in the Economics market, with over 1 billion answers entered. Online interactive problem sets, analyses, tutorials, experiments, and critical-thinking exercises give students hands-on application without adding to instructors'

workload. Based on discovery learning, Aplia requires students to take an active role in the learning process—helping them improve their economic understanding and ability to relate to the economic concepts presented. Instructors can assign homework that is automatically graded and recorded.

Embedded in the Aplia product for Arnold's 13th Edition is the fully interactive, media rich eReader. Combining the functionality you and your students are coming to expect from a modern eReader (text search, highlighting, note-taking) with our exclusive embedded media—Video Questions and Problems, and ConceptClips—this robust reading experience is just a click away as students work through their Aplia problem sets.

Aplia Homework: Prices, Free, Controlled, and Relative

1. Price as a rationing device

Suppose that there are three beachfront parcels of land available for sale in Astomar, and six people who would each like to purchase one parcel. Assume that the parcels are essentially identical and that the minimum selling price of each is \$395,000. The following table states each person's willingness and ability to purchase a parcel.

Willingness and Ability to Purchase (dollars)	
Andrew	540,000
Beth	530,000
Lorenzo	750,000
Neha	660,000
Sam	620,000
Teresa	570,000

Which of these people will buy one of the three beachfront parcels? Check all that apply.

- Andrew
- Beth
- Lorenzo
- Neha
- Sam
- Teresa

Points: 0 / 1

Explanation:

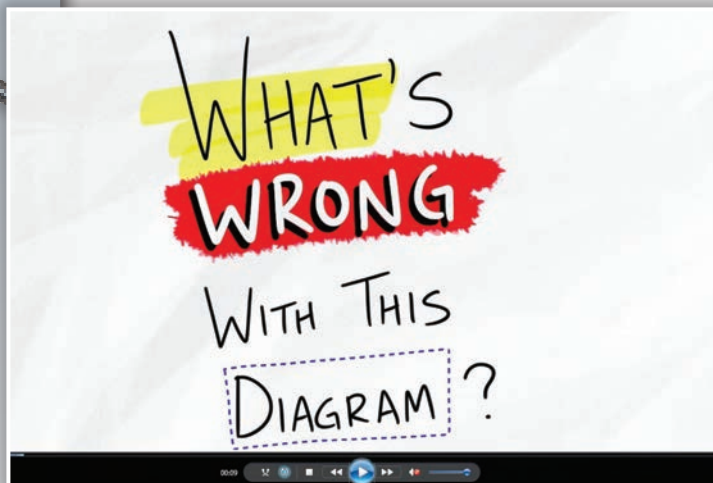
Close Explanation ^

Lorenzo, Neha, and Sam will purchase the parcels because they are the only ones willing and able to meet the minimum selling price of \$395,000. One or more of the other three people might have the ability but not the willingness to pay the required price. Moreover, perhaps Teresa, Andrew, and Beth have a strong desire to own beachfront land in Astomar, but they do not have the ability to pay the selling price.

“What’s Wrong With This Diagram?” assignable video quizzing walks students through the creation of a diagram, then stops the video and provides

assessment that is focused on what is wrong with the newly created diagram.

Once answered, the video continues to play and provides remediation and explanation. These activities are available in MindTap.



Because cultivating an economic way of thinking requires building on a foundation of theory and its application to real-world examples, **ECONOMICS, 13e** continues to set the standard for thoroughly updated content. In this edition, “Here What and How the Economist Thinks” and “Does It Matter to You If . . .?” are two new features included in every chapter. The first feature gives insight into just how economists go about thinking about various topics. The second feature ties what students read in an economics principles book—on such subjects as market structures, interest rates, aggregate demand and supply, monetary and fiscal policy, regulation and antitrust—directly to how each affects them. Does It Matter To You If You are Efficient or Not? or If the Economy is at One Point on the PPF Instead of Another? or If Something You Buy Is Taxed or Subsidized? It certainly does.

ECONOMICS 24/7

Obesity and a Soda Tax

The percentage of the U.S. population that is deemed obese today is higher than it was 20 years ago. Obesity is a health problem, so we often hear proposals directed at trying to reduce the obesity rate in the country. One proposal is to place a tax on high-fat, high-calorie so-called junk food. A similar proposal is to place a tax on soda.

We now know that a tax placed on one good (but not on another) will change the relative prices of the two goods. Placing a tax on good X, but not on good Y, will make good X relatively more expensive and Y relatively cheaper, prompting consumers to purchase relatively less X and relatively more Y.

Consider a tax placed on soda. We would expect the absolute (money) price of soda to rise. And if the tax is placed only on soda, its relative price will rise too. As soda becomes relatively more expensive, we would expect fewer sodas to be consumed and obesity to decline. Right? Well, fewer sodas might be purchased and consumed, but whether obesity will decline is not so clear. Consider soda and sugared iced tea. Both soda and sugared iced tea are sweet drinks. They might even be substitutes. With this idea in mind, suppose the absolute price of a soda is \$1 and the absolute price of an iced tea (with sugar) is 50¢. It follows that the relative prices are

$$\begin{aligned} 1 \text{ soda} &= 2 \text{ sugared iced teas} \\ 1 \text{ sugared iced tea} &= \frac{1}{2} \text{ soda} \end{aligned}$$

Now let's place a tax on soda that drives its price up to \$2. The new relative prices for soda and iced tea are

$$\begin{aligned} 1 \text{ soda} &= 4 \text{ sugared iced teas} \\ 1 \text{ sugared iced tea} &= \frac{1}{4} \text{ soda} \end{aligned}$$

As a result of the tax on soda, its relative price has risen, but the relative price of sugared iced tea has fallen. We would thus expect people to consume relatively less soda and relatively more sugared iced tea.

Obesity is lessened by ingesting fewer calories, not the same number or more calories. Simply put, the soda tax might reduce the consumption of sodas, but it doesn't necessarily reduce obesity. Although the soda tax makes soda relatively more expensive, it makes soda substitutes (such as sugared iced tea) relatively less expensive and thus makes a rise in the consumption of sugared iced tea more likely.



Photo: iStockphoto.com/Peter McCannella

IN APPRECIATION

Many colleagues have contributed to the success of this text over the last twelve editions. Their feedback continues to influence and enhance the text and ancillary package and I'm grateful for their efforts. Now into our 13th edition, space dictates that we can no longer list the names of all reviewers for each past edition; we are including here instructors who contributed to the development of the 13th edition, but continue to be grateful for the improvements suggested by all of the reviewers and contributors to this product over the years.

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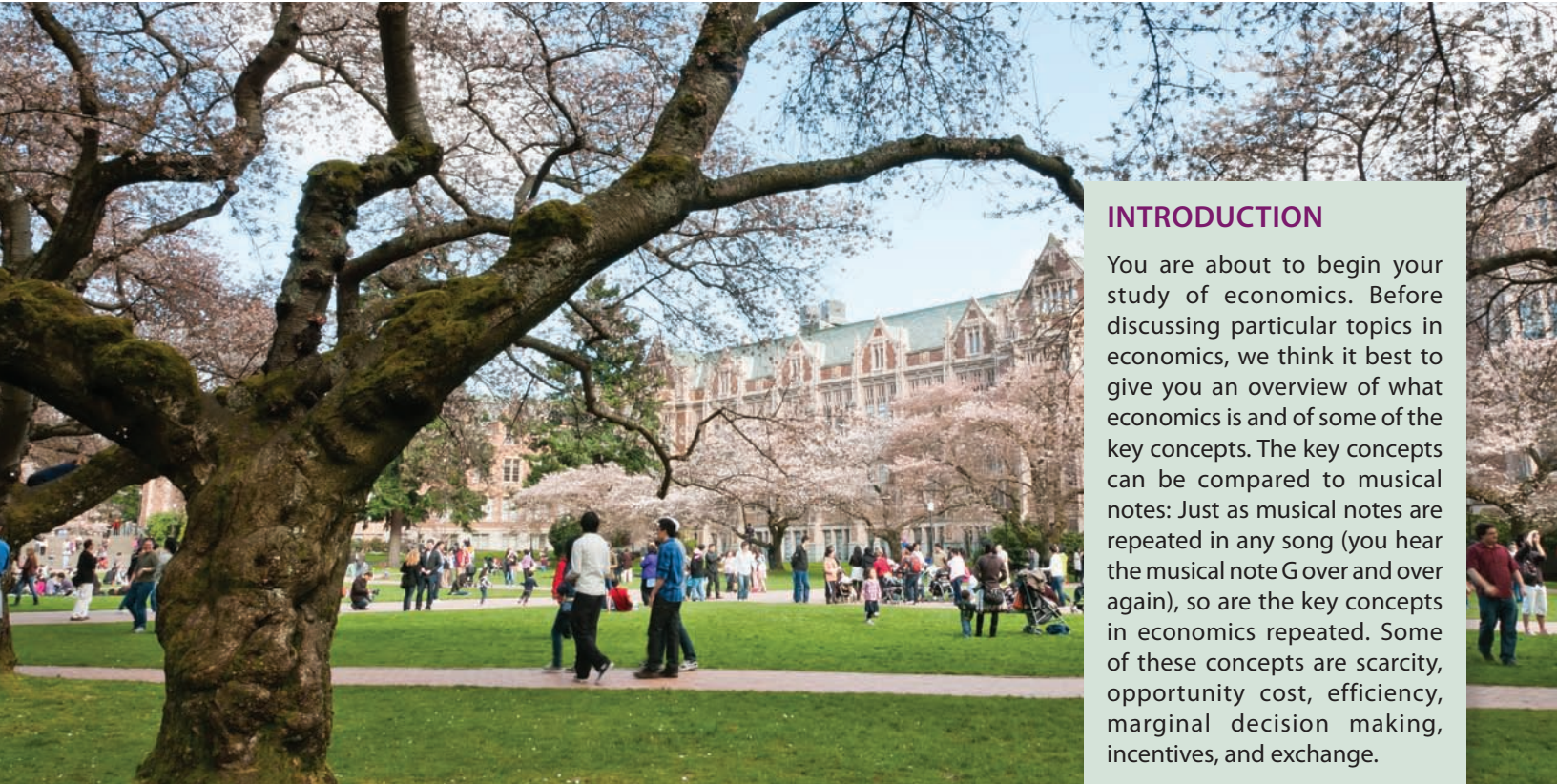
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My deepest debt of gratitude goes to my wife, Sheila, and to my two sons, David and Daniel. They continue to make all my days happy ones.

Roger A. Arnold

WHAT ECONOMICS IS ABOUT



INTRODUCTION

You are about to begin your study of economics. Before discussing particular topics in economics, we think it best to give you an overview of what economics is and of some of the key concepts. The key concepts can be compared to musical notes: Just as musical notes are repeated in any song (you hear the musical note G over and over again), so are the key concepts in economics repeated. Some of these concepts are scarcity, opportunity cost, efficiency, marginal decision making, incentives, and exchange.

1-1 YOUR LIFE, 2019–2029

What will your life be like during the years 2019–2029? What kind of work will you do after college? How much will you earn in that first job after college? Where will you be living and who will your friends be? How many friends will you have? Will you buy a house in the next few years? If so, how much will you pay for the house? And, perhaps most importantly, will you be happy?

The specific answers to these questions and many more have to do with economics. For example, the salary you will earn has to do with the economic concept of *opportunity cost*. What you will do in your first job after college has to do with the *state of the economy* when you graduate. The price you pay for a house has to do with the state of the *housing market*. How many friends you have has to do with the economic concept of *scarcity*. Whether you are happy will depend on such things as the *net benefits* you receive in various activities, the *utility* you gain by doing certain things, and more.

In this chapter, we begin our study of economics. As you read the chapter (and those which follow), ask yourself how much of what you are reading is relevant to your life today and tomorrow. Ask: What does what I am reading have to do with *my* life? Our guess is that after answering this question a few dozen times, you will be convinced that economics explains much about your present and future.

1-2 A DEFINITION OF ECONOMICS

In this section, we discuss a few key economic concepts; then we incorporate knowledge of these concepts into a definition of economics.

1-2a Goods and Bads

Economists talk about *goods* and *bads*. A **good** is anything that gives a person **utility**, or satisfaction. Here is a partial list of some goods: a computer, a car, a watch, a television set, friendship, and love. You will notice from our list that a good can be either tangible or intangible. A computer is a tangible good; friendship is an intangible good. Simply put, for something to be a good (whether tangible or intangible), it only has to give someone utility or satisfaction.

A **bad** is something that gives a person **disutility** or dissatisfaction. If the flu gives you disutility or dissatisfaction, then it is a bad. If the constant nagging of an acquaintance is something that gives you disutility or dissatisfaction, then it is a bad.

People want goods, and they do not want bads. In fact, they will pay to get goods (“Here is \$1,000 for the computer”), and they will pay to get rid of bads (“I’d be willing to pay you, doctor, if you can prescribe something that will shorten the time I have the flu”).

Can something be a *good* for one person and a *bad* for another person? Smoking cigarettes gives some people utility; it gives others disutility. We conclude that smoking cigarettes can be a *good* for some people and a *bad* for others. This must be why the wife tells her husband, “If you want to smoke, you should do it outside.” In other words, “Get those *bads* away from me.”

1-2b Resources

Goods do not just appear before us when we snap our fingers. It takes resources to produce goods. (Sometimes *resources* are referred to as *inputs* or *factors of production*.)

Generally, economists divide resources into four broad categories: *land*, *labor*, *capital*, and *entrepreneurship*.

- **Land** includes natural resources, such as minerals, forests, water, and unimproved land. For example, oil, wood, and animals fall into this category. (Sometimes economists refer to the category simply as *natural resources*.)
- **Labor** consists of the physical and mental talents that people contribute to the production process. For example, a person building a house is using his or her own labor.
- **Capital** consists of produced goods that can be used as inputs for further production. Factories, machinery, tools, computers, and buildings are examples of capital. One country might have more capital than another; that is, it has more factories, machinery, tools, and the like.
- **Entrepreneurship** refers to the talent that some people have for organizing the resources of land, labor, and capital to produce goods, seek new business opportunities, and develop new ways of doing things.

1-2c Scarcity and a Definition of Economics

We are now ready to define a key concept in economics: *scarcity*. **Scarcity** is the condition in which our wants (for goods) are greater than the limited resources (land, labor, capital, and entrepreneurship) available to satisfy those wants. In other words, we want goods, but not enough resources are available to provide us with all the goods we want.

Look at it this way: Our wants (for goods) are infinite, but our resources (which we need to produce the goods) are finite. Scarcity is the result of our infinite wants hitting up against finite resources.

Good

Anything from which individuals receive utility or satisfaction.

Utility

The satisfaction one receives from a good.

Bad

Anything from which individuals receive disutility or dissatisfaction.

Disutility

The dissatisfaction one receives from a bad.

Land

All natural resources, such as minerals, forests, water, and unimproved land.

Labor

The work brought about by the physical and mental talents that people contribute to the production process.

Capital

Produced goods, such as factories, machinery, tools, computers, and buildings that can be used as inputs for further production.

Entrepreneurship

The talent that some people have for organizing the resources of land, labor, and capital to produce goods, seek new business opportunities, and develop new ways of doing things.

Scarcity

The condition in which our wants are greater than the limited resources available to satisfy those wants.

Many economists say that if scarcity didn't exist, neither would economics. In other words, if our wants weren't greater than the limited resources available to satisfy them, there would be no field of study called economics. This is similar to saying that if matter and motion didn't exist, neither would physics or that if living things didn't exist, neither would biology. For this reason, we define **economics** in this text as the science of scarcity. More completely, *economics is the science of how individuals and societies deal with the fact that wants are greater than the limited resources available to satisfy those wants.*

Economics

The science of scarcity; the science of how individuals and societies deal with the fact that wants are greater than the limited resources available to satisfy those wants.

THINKING LIKE AN ECONOMIST

Scarcity Affects Everyone Everyone in the world—even a billionaire—has to face scarcity. Billionaires may be able to satisfy more of their wants for tangible goods (houses, cars) than most people, but they still may not have the resources to satisfy all their wants. Their wants might include more time with their children, more friendship, no disease in the world, peace, and a hundred other things that they don't have the resources to "produce."

Thinking in Terms of Scarcity's Effects Scarcity has effects. Here are three: (1) the need to make choices, (2) the need for a rationing device, and (3) competition.

Choices People have to make choices because of scarcity. Because our unlimited wants are greater than our limited resources, some wants must go unsatisfied. We must choose which wants we will satisfy and which we will not. Jeremy asks, "Do I go to Hawaii or do I pay off my car loan earlier?" Ellen asks, "Do I buy the new sweater or two new shirts?"

Need for a Rationing Device A **rationing device** is a means of deciding who gets what of available resources and goods. Scarcity implies the need for a rationing device. If people have infinite wants for goods and if only limited resources are available to produce the goods, then a rationing device is needed to decide who gets the available quantity of goods. Dollar price is a rationing device. For instance, 100 cars are on the lot, and everyone wants a new car. How do we decide who gets what quantity of the new cars? The answer is to use the rationing device called *dollar price*. The people who pay the dollar price for a new car end up with one.

Rationing Device

A means for deciding who gets what of available resources and goods.

Scarcity and Competition Do you see competition in the world? Are people competing for jobs? Are states and cities competing for businesses? Are students competing for grades? The answer to all these questions is yes. The economist wants to know why this competition exists and what form it takes. First, the economist concludes, competition exists because of scarcity. If there were enough resources to satisfy all our seemingly unlimited wants, people would not have to compete for the available, but limited, resources.

Second, the economist sees that competition takes the form of people trying to get more of the rationing device. If dollar price is the rationing device, people compete to earn dollars. Look at your own case. You are a college student working for a degree. One reason (but perhaps not the only reason) you are attending college is to earn a higher income after graduation. But why do you want a higher income? You want it because it will allow you to satisfy more of your wants.

Suppose muscular strength (measured by lifting weights), instead of dollar price, were the rationing device. Then people with more muscular strength would receive more resources and goods than people with less muscular strength. In that case, people would compete for muscular strength. (Would they spend more time at the gym lifting weights?) The lesson is simple: *Whatever the rationing device is, people will compete for it.*

FINDING ECONOMICS

At the campus bookstore To learn economics well, you must practice what you learn. One of the ways to practice economics is to find it in everyday life. Consider the following scene: You are in the campus bookstore buying a book for your computer science course, and you are handing over \$85 to the cashier. Can you find the economics in this simple scene? Before you read on, think about it for a minute.

Let's work backward to find the economics. You are currently handing the cashier \$85. We know that dollar price is a rationing device. But let's now ask ourselves why we would need a rationing device to get the book. The answer is scarcity. In other words, scarcity is casting its long shadow there in the bookstore as you buy a book. We have found one of the key economic concepts—scarcity—in the campus bookstore. (If you also said that a book is a good, then you have found even more economics in the bookstore. Can you find more than scarcity and a good?)

SELF-TEST

(Answers to Self-Test questions are in Answers to Self-Test Questions at the back of the book.)

1. True or false? Scarcity is the condition of finite resources. Explain your answer.
2. How does competition arise out of scarcity?
3. How does choice arise out of scarcity?

1-3 KEY CONCEPTS IN ECONOMICS

A number of key concepts in economics define the field. We discuss a few of these concepts next.

1-3a Opportunity Cost

So far, we have established that people must make choices because scarcity exists. In other words, because our seemingly unlimited wants push up against limited resources, some wants must go unsatisfied. We must therefore *choose* which wants we will satisfy and which we will not. The most highly valued opportunity or alternative forfeited when we make a choice is known as **opportunity cost**. Every time you make a choice, you incur an opportunity cost. For example, you have chosen to read this chapter. In making this choice, you denied yourself the benefits of doing something else. You could have watched television, written text messages to a friend, taken a nap, eaten a few slices of pizza, read a novel, shopped for a new computer, and so on. Whatever you *would have chosen* to do is the opportunity cost of your reading this chapter. For instance, if you would have watched television instead of reading this chapter—if that was your next best alternative—then the opportunity cost of reading the chapter is watching television.

There Is No Such Thing as a Free Lunch Economists are fond of saying that “there is no such thing as a free lunch.” This catchy phrase expresses the idea that opportunity costs are incurred whenever choices are made. Perhaps this is an obvious point, but consider how often people mistakenly assume that there *is* a free lunch. For example, some parents think that education is free, because they do not pay tuition for their children to attend public elementary school. That's a misconception. “Free” implies no sacrifice and no opportunities forfeited, but an elementary school education requires resources that could be used for other things.

Consider the people who speak about free medical care, free housing, free bridges (“there's no charge to cross it”), and free parks. Again, free medical care, free housing, free bridges, and free parks are misconceptions. The resources that provide medical care, housing, bridges, and parks could have been used in other ways.

Opportunity Cost

The most highly valued opportunity or alternative forfeited when a choice is made.

ECONOMICS 24/7

Rationing Spots at Yale

Each year, Yale University receives more applications for admission to the freshmen class than spots are available. In most years, for every 100 applications for admission that Yale receives, it can accept only seven applicants for admission. What Yale has to do, then, is ration its available admission spots.

How does it ration its available spots? One way is simply to use money as a rationing device. In other words, raise the dollar amount of attending Yale to a high enough level so that the number of spots equals the number of students willing and available to pay for admission. To illustrate, think of Yale as auctioning off spots in its freshman class. It calls out a price of \$50,000 a year, and at this price more people wish to be admitted to Yale than there are spots available. Yale keeps on raising the price until the number of students who are willing and able to pay the tuition is equal to the number of available spots. Maybe this price is, say, \$200,000.

As we know, Yale does not ration its available spots this way. In fact, it uses numerous rationing devices in an attempt to whittle down the number of applicants to the number of available spots. For example, it might use the rationing device of high school grades. Anyone with a GPA in high school of less than, say, 3.50 is not going to be admitted. If, after doing this, Yale still has too many applicants, it might then make use of the rationing device of standardized test scores. Anyone with an SAT score of under, say, 2100 is eliminated from the pool of applicants. If there are still too many applicants, then perhaps other rationing devices will be used, such as academic achievements, community service, degree of interest in attending Yale, and so on.



iStock.com/peterspiro

Yale might also decide that it wants to admit certain students over others, even if the two categories of students have the same academic credentials. For example, suppose Yale wants at least one student from each state in the country, and only 10 students from Wyoming have applied to go to Yale whereas 500 students from California have applied. Then Yale could very well use the rationing device of state

diversity to decide in favor of the student from Wyoming instead of the applicant from California.

In the first week of April each year, Yale sends out many more rejection letters than acceptance letters. No doubt, some students who are rejected by Yale feel that some of the students who were accepted might not be as academically strong as they are. No doubt, the student with a 4.00 GPA and a perfect SAT score of 2400 feels that he might have been slighted by Yale when he learns that a student in his high school with a 3.86 GPA and SAT score of 2180 was chosen over him. What did the 3.86–2180 student have that he didn't have? What rationing device benchmark did the rejected student score lower on?

In life, you will often hear people arguing over what the rationing device for certain things should be. Should high school grades and standardized test scores be the only two rationing devices for college admission? What role should money play as a rationing device when a high school graduate applies to college? What role should ethnic or racial diversity, or state diversity, or income diversity play in the application process? Our point is a simple one: With scarcity comes the need for a rationing device. More people want a spot at Yale than there are spots available. Yale has to use one or more rationing devices to decide who will be accepted and who will be rejected.

THINKING LIKE AN ECONOMIST

Zero Price Doesn't Mean Zero Cost A friend gives you a ticket to an upcoming concert for zero price (i.e., you pay nothing). Does it follow that zero price means zero cost? No. There is still an opportunity cost of attending the concert. Whatever you would be doing if you don't go to the concert is the opportunity cost of attending. To illustrate, if you don't attend the concert, you would hang out with friends. The value you place on hanging out with friends is the opportunity cost of your attending the concert.

1-3b Opportunity Cost and Behavior

Economists believe that a change in opportunity cost can change a person's behavior. For example, Ryan, who is a sophomore at college, attends classes Monday through Thursday of every week. Every time he chooses to go to class, he gives up the opportunity to do something else, such as earn \$15 an hour working at a job. The opportunity cost of Ryan's spending an hour in class is \$15.

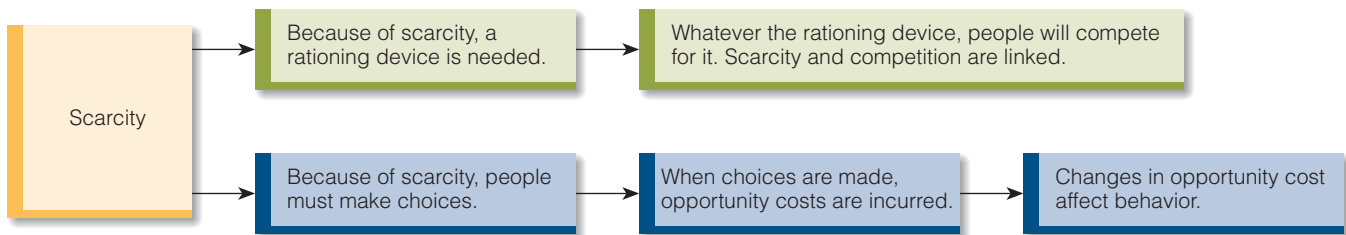
Now let's raise the opportunity cost of attending class. On Tuesday, we offer Ryan \$70 to skip his economics class. He knows that if he attends his economics class, he will forfeit \$70. What will Ryan do? An economist would predict that as the opportunity cost of attending class increases relative to the benefits of attending, Ryan is less likely to go to class.

This is how economists think about behavior: *The higher the opportunity cost of doing something, the less likely it is that it will be done.* This is part of the economic way of thinking.

Look at Exhibit 1, which summarizes some of the things about scarcity, choice, and opportunity cost up to this point.

EXHIBIT 1

Scarcity and Related Concepts



FINDING ECONOMICS

In Being Late to Class John is often a few minutes late to his biology class. The class starts at 10 a.m., but John usually walks into the class at 10:03 a.m. The instructor has asked John to be on time, but John usually excuses his behavior by saying that the traffic getting to college was bad or that his alarm didn't go off at the right time or that something else happened to delay him. One thing the instructor observes, though, is that John is never late when it comes to test day. He is usually in class a few minutes before the test begins. Where is the economics?

We would expect behavior to change as opportunity cost changes. When a test is being given in class, the opportunity cost of being late to class is higher than when a test is not being given and the instructor is simply lecturing. If John is late to class on test day, he then has fewer minutes to complete the test, and having less time can adversely affect his grade. In short, the higher the opportunity cost of being late to class, the less likely it is that John will be late.

1-3c Benefits and Costs

If we could eliminate air pollution completely, should we do it? If your answer is yes, then you are probably focusing on the *benefits* of eliminating air pollution. For example, one benefit might be healthier individuals. Certainly, individuals who do not breathe polluted air have fewer lung disorders than people who do breathe polluted air.

But benefits rarely come without costs. The economist reminds us that, although eliminating pollution has its benefits, it has costs too. To illustrate, one way to eliminate all car pollution tomorrow is to pass a law stating that anyone caught driving a car will go to prison for 40 years. With such a draconian law in place and enforced, very few people would drive cars and all car pollution would be a thing of the past. Presto! Cleaner air! However, many people would think that the cost of obtaining that cleaner air is too high. Someone might say, “I want cleaner air, but not if I have to completely give up driving my car. How will I get to work?”

What distinguishes the economist from the noneconomist is that the economist thinks in terms of *both* costs *and* benefits. Often, the noneconomist thinks in terms of one or the other. Studying has its benefits, but it has costs too. Coming to class has benefits, but it has costs too. Getting up early each morning and exercising has its costs, but let’s not forget that there are benefits too.

1-3d Decisions Made at the Margin

It is late at night, and you have already studied three hours for your biology test tomorrow. You look at the clock and wonder if you should study another hour. How would you summarize your thinking process? What question or questions do you ask yourself to decide whether to study another hour?

Perhaps without knowing it, you think in terms of the costs and benefits of further study. You probably realize that studying an additional hour has certain benefits (you may be able to raise your grade a few points), but it has costs too (you will get less sleep or have less time to watch television or talk on the phone with a friend). *That* you think in terms of costs and benefits, however, doesn’t tell us *how* you think in terms of costs and benefits. For example, when deciding what to do, do you look at the *total costs* and *total benefits* of the proposed action, or do you look at something less than the total costs and benefits? According to economists, for most decisions, you think in terms of *additional*, or *marginal*, costs and benefits, not *total* costs and benefits. That’s because most decisions deal with making a small, or additional, change.

To illustrate, suppose you just finished eating a hamburger and drinking a soda for lunch. You are still a little hungry and are considering whether to order another hamburger. An economist would say that, in deciding whether to order another hamburger, you compare the additional benefits of the second hamburger with its additional costs. In economics, the word *marginal* is a synonym for *additional*. So, we say that you compare the **marginal benefits (MB)** of the (next) hamburger to its **marginal costs (MC)**. If the marginal benefits are greater than the marginal costs, you obviously expect a net benefit to ordering the next hamburger, and therefore you order another. If, however, the marginal benefits are less than the marginal costs, you obviously expect a net cost to ordering the next hamburger, and therefore you do not order another. Logically, the situation is as follows:

Condition	Action
MB of next hamburger $>$ MC of next hamburger	Buy next hamburger
MB of next hamburger $<$ MC of next hamburger	Do not buy next hamburger

What you don’t consider when making this decision are the *total* benefits and *total* costs of hamburgers. That’s because the benefits and costs connected with the first hamburger (the one you have already eaten) are no longer relevant to the current decision. You are not deciding between eating two hamburgers or eating no hamburgers; your decision is whether to eat a second hamburger after you have already eaten one.

According to economists, when individuals make decisions by comparing marginal benefits with marginal costs, they are making **decisions at the margin**. The employee makes a decision at the margin in deciding whether to work two hours overtime; the economics professor makes a decision at the margin in deciding whether to put an additional question on the final exam.

Marginal Benefits (MB)

Additional benefits; the benefits connected with consuming an additional unit of a good or undertaking one more unit of an activity.

Marginal Costs (MC)

Additional costs; the costs connected with consuming an additional unit of a good or undertaking one more unit of an activity.

Decisions at the Margin

Decision making characterized by weighing the additional (marginal) benefits of a change against the additional (marginal) costs of a change with respect to current conditions.

ECONOMICS 24/7

When Is It Too Costly to Attend College?

Look around your class. Are there any big-name actors, sports stars, or comedians between the ages of 18 and 25 in your class? Probably not. The reason is that, for these people, the opportunity cost of attending college is much higher than it is for most 18-to-25-year-olds. Think of LeBron James, a basketball star, Chris Rock, a comedian, Johnny Depp, an actor, Will Smith, also an actor—these people and many more like them chose not to go to college. Why didn't they go to college? The fact is that they didn't go to college because it was too expensive for them to go to college. Not "too expensive" in the sense that the "tuition was too high," but expensive in terms of what they would have had to give up if they attended college—expensive in opportunity cost terms.

To understand this idea, think of what it's costing you to attend college. If you pay \$3,000 tuition a semester for eight semesters, the full tuition amounts to \$24,000. However, \$24,000 is not the full cost of attending college, because if you were not a student, you could be earning income working at a job. For example, you could be working at a full-time job earning \$32,000 annually. Certainly, this \$32,000, or at least part of it if you are currently working part time, is forfeited because you are attending college. It is part of the total cost of your attending college.

The *tuition cost* may be the same for everyone who attends your college, but the *opportunity cost* is not. Some people have higher opportunity costs of attending college than others. It just so happens that Johnny Depp, LeBron James, Will Smith, and Chris Rock had extremely high opportunity costs of attending college. Each would have to give up hundreds of thousands of dollars if he were to attend college on a full-time basis.

Simply put, our story illustrates two related points we have made in this chapter. First, earlier we said that *the higher the opportunity cost of doing something, the less likely it will be done*. The opportunity cost of attending college is higher for some people than others, and that is why not everyone who can pay for college chooses to attend college.



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Second, we said that economists believe that *individuals think and act in terms of costs and benefits and that they undertake actions only if they expect the benefits to outweigh the costs*. Thus, Johnny Depp, LeBron James, Will Smith, and Chris Rock saw certain benefits to attending college—just as you see certain benefits to attending college. But those benefits—although they may be the same for you and everyone else—are not enough to get everyone to attend college. That's because the benefits are not all that matters. The costs matter, too. In the case of Johnny Depp, LeBron James, Will Smith, and Chris Rock, the costs of attending college were much higher than the benefits, so they chose not to attend college. In your case, the benefits are higher than the costs, so you have decided to attend college.

1-3e Efficiency

What is the right amount of time to study for a test? In economics, the *right amount* of anything is the *optimal* or *efficient* amount—the amount for which the marginal benefits equal the marginal costs. Stated differently, you have achieved **efficiency** when the marginal benefits equal the marginal costs.

Suppose you are studying for an economics test, and for the first hour of studying, the marginal benefits (*MB*) are greater than the marginal costs (*MC*):

$$MB \text{ studying first hour} > MC \text{ studying first hour}$$

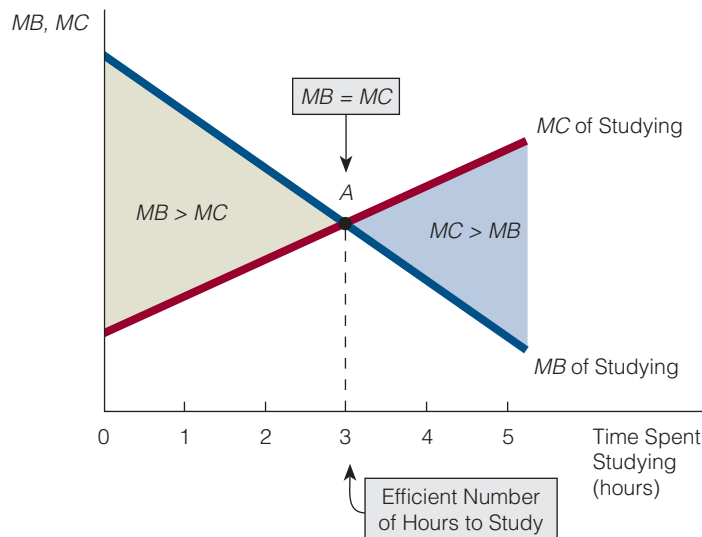
Given this condition, you will certainly study for the first hour, because it is worth it: The additional benefits are greater than the additional costs, so there is a net benefit to studying.

Suppose, for the second hour of studying, the marginal benefits are still greater than the marginal costs:

$$MB \text{ studying second hour} > MC \text{ studying second hour}$$

Then you will study for the second hour, because the additional benefits are still greater than the additional costs. In other words, studying the second hour is worthwhile. In fact, you will continue to study as long as the marginal benefits are greater than the marginal costs. Exhibit 2 illustrates this discussion graphically.

EXHIBIT 2



Efficiency

MB = marginal benefits and *MC* = marginal costs. In the exhibit, the *MB* curve of studying is downward sloping and the *MC* curve of studying is upward sloping. As long as $MB > MC$, the person will study. The person stops studying when $MB = MC$. This point is where efficiency is achieved.