



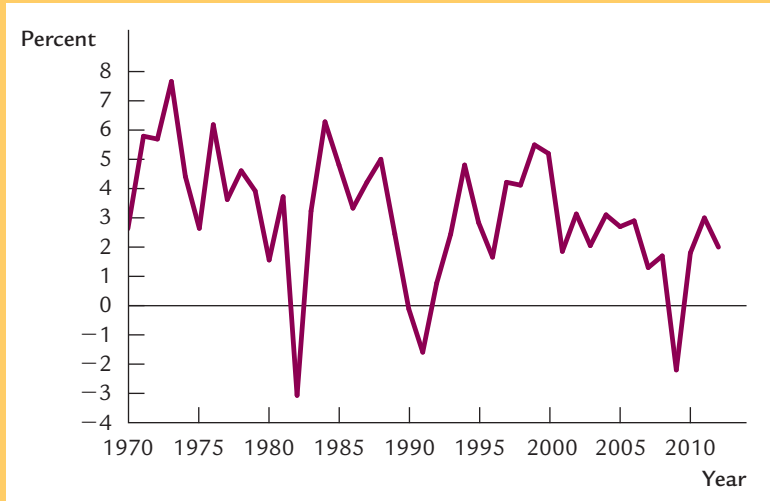
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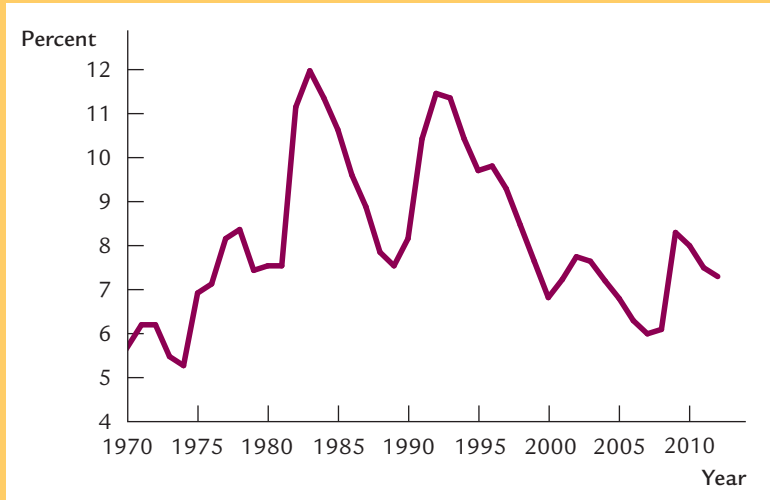
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N. GREGORY MANKIW ■ WILLIAM SCARTH

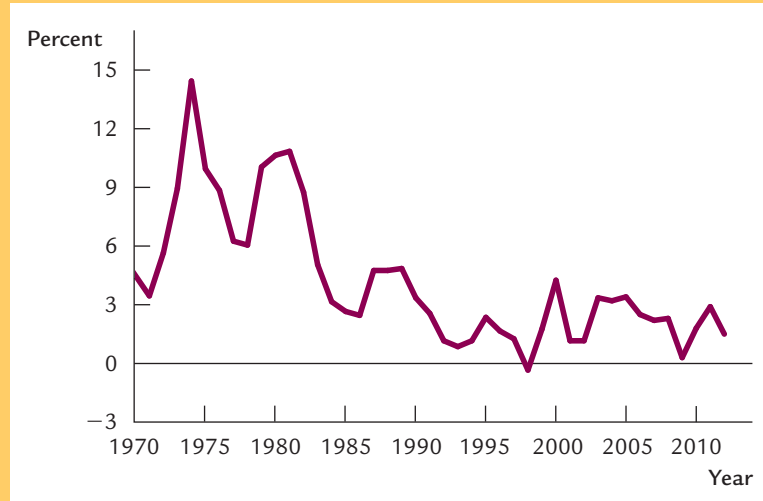
Real GDP Growth



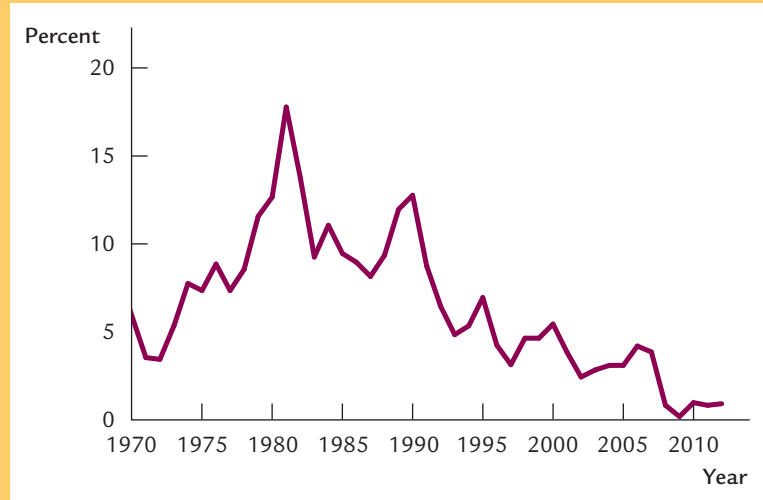
Unemployment Rate



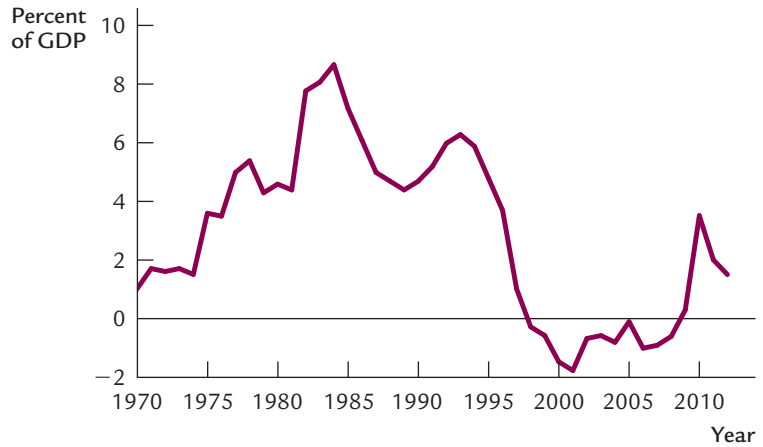
Inflation Rate
(GDP Deflator)



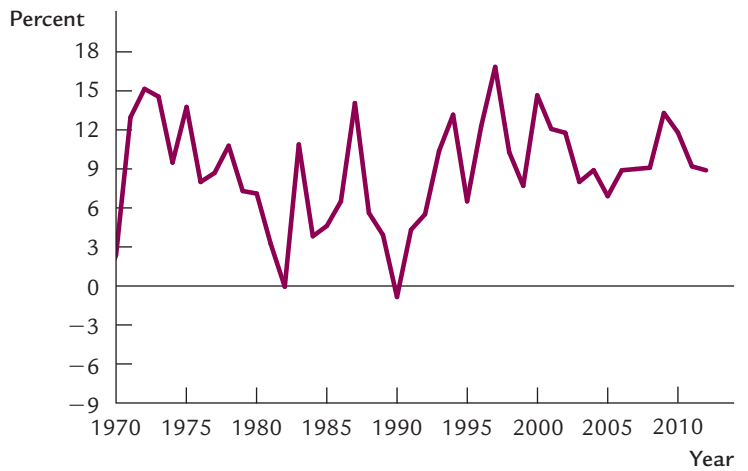
Nominal Interest Rate
(Three-Month Treasury Bills)



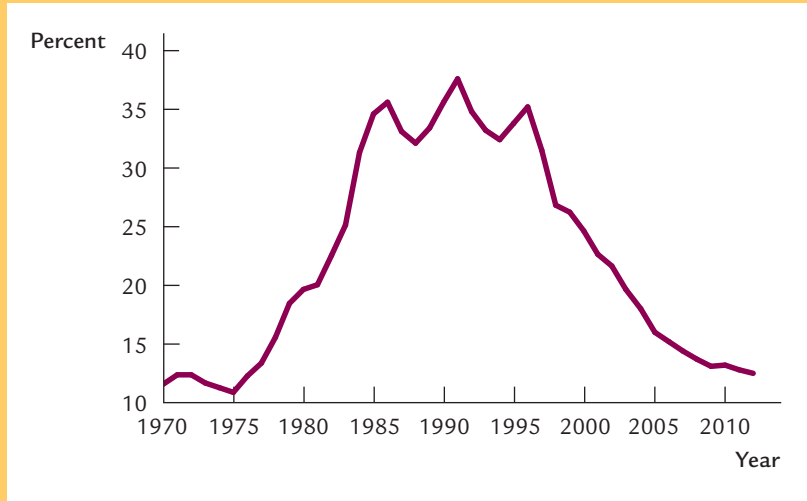
Federal Government Deficit-GDP Ratio



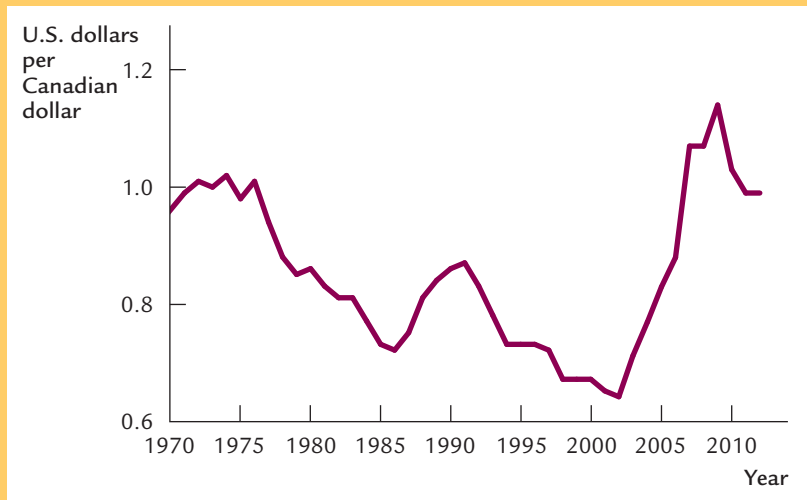
Money Growth (M1)



**Debt Interest
Payments as
Percentage of
Revenue (Federal
Government)**



**Nominal
Exchange
Rate**



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N. GREGORY MANKIW ■ WILLIAM SCARTH

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To Deborah and Kathy

about the authors



Photo by Jordi Cabré

N. Gregory Mankiw is Professor of Economics at Harvard University. He began his study of economics at Princeton University, where he received an A.B. in 1980. After earning a Ph.D. in economics from MIT, he began teaching at Harvard in 1985 and was promoted to full professor in 1987. Today, he regularly teaches both undergraduate and graduate courses in macroeconomics. He is also author of the popular introductory textbook, *Principles of Economics* (Cengage Learning).

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Photo by Kathy Scarth

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Those branches of politics, or of the laws of social life, on which there exists a collection of facts sufficiently sifted and methodized to form the beginning of a science should be taught *ex professo*. Among the chief of these is Political Economy, the sources and conditions of wealth and material prosperity for aggregate bodies of human beings. . . .

The same persons who cry down Logic will generally warn you against Political Economy. It is unfeeling, they will tell you. It recognises unpleasant facts. For my part, the most unfeeling thing I know of is the law of gravitation: it breaks the neck of the best and most amiable person without scruple, if he forgets for a single moment to give heed to it. The winds and waves too are very unfeeling. Would you advise those who go to sea to deny the winds and waves—or to make use of them, and find the means of guarding against their dangers? My advice to you is to study the great writers on Political Economy, and hold firmly by whatever in them you find true; and depend upon it that if you are not selfish or hard-hearted already, Political Economy will not make you so.

— *John Stuart Mill, 1867*

brief contents

Preface xxvi

part I

Introduction

Chapter 1 The Science of Macroeconomics 3

Chapter 2 The Data of Macroeconomics 19

part II

Classical Theory: The Economy in the Long Run

Chapter 3 National Income: Where It Comes From and Where It Goes 49

Chapter 4 Money and Inflation 85

Chapter 5 The Open Economy 129

Chapter 6 Unemployment 175

part III

Growth Theory: The Economy in the Very Long Run

Chapter 7 Economic Growth I: Capital Accumulation and Population Growth 217

Chapter 8 Economic Growth II: Technology, Empirics, and Policy 249

part IV

Business Cycle Theory: The Economy in the Short Run

Chapter 9 Introduction to Economic Fluctuations 291

Chapter 10 Aggregate Demand I: Building the *IS–LM* Model 315

Chapter 11 Aggregate Demand II: Applying the *IS–LM* Model 343

Chapter 12 The Open Economy Revisited: The Mundell–Fleming Model and the Exchange-Rate Regime 377

Chapter 13 Aggregate Supply and the Short-Run Tradeoff Between Inflation and Unemployment 425

Chapter 14 A Dynamic Model of Aggregate Demand and Aggregate Supply 459

part V

Macroeconomic Policy Debates

Chapter 15 Stabilization Policy 511

Chapter 16 Government Debt and Budget Deficits 535

part VI

More on the Microeconomics Behind Macroeconomics

Chapter 17 Consumption 573

Chapter 18 Investment 605

Chapter 19 Money Supply and Money Demand 633

Chapter 20 The Financial System: Opportunities and Dangers 657

Epilogue What We Know, What We Don't 685

Glossary G-1

Index I-1

contents

Preface xxvi

part I Introduction

Chapter 1 The Science of Macroeconomics 3

- 1-1 What Macroeconomists Study 3
 - ▶ **CASE STUDY** *The Historical Performance of the Canadian Economy* 5
- 1-2 How Economists Think 8
 - Theory as Model Building 8
 - ▶ **FYI** *Using Functions to Express Relationships Among Variables* 12
 - The Use of Multiple Models 12
 - Prices: Flexible Versus Sticky 13
 - ▶ **FYI** *Nobel Macroeconomists* 14
 - Microeconomic Thinking and Macroeconomic Models 15
- 1-3 How This Book Proceeds 16

Chapter 2 The Data of Macroeconomics 19

- 2-1 Measuring the Value of Economic Activity: Gross Domestic Product 20
 - Income, Expenditure, and the Circular Flow 21
 - Some Rules for Computing GDP 22
 - ▶ **FYI** *Stocks and Flows* 23
 - Real GDP Versus Nominal GDP 26
 - The GDP Deflator 27
 - Chain-Weighted Measures of Real GDP 28
 - The Components of Expenditure 28
 - ▶ **FYI** *Two Arithmetic Tricks for Working with Percentage Changes* 29
 - ▶ **FYI** *What Is Investment?* 30
 - ▶ **CASE STUDY** *GDP and Its Components* 31
 - Several Measures of Income 32
 - ▶ **CASE STUDY** *Seasonal Adjustment* 34
- 2-2 Measuring the Cost of Living: The Consumer Price Index 34
 - The Price of a Basket of Goods 34
 - The CPI Versus the GDP Deflator 35
 - ▶ **CASE STUDY** *Difficulties in Measuring Inflation* 37

- 2-3 Measuring Joblessness: The Unemployment Rate 39
 - ▶ **CASE STUDY** *Trends in Labour-Force Participation* 40
 - Unemployment, GDP, and Okun’s Law 41
- 2-4 Conclusion: From Economic Statistics to Economic Models 43

part II Classical Theory: The Economy in the Long Run

Chapter 3 National Income: Where It Comes From and Where It Goes 49

- 3-1 What Determines the Total Production of Goods and Services? 51
 - The Factors of Production 51
 - The Production Function 52
 - The Supply of Goods and Services 52
- 3-2 How Is National Income Distributed to the Factors of Production? 53
 - Factor Prices 53
 - The Decisions Facing the Competitive Firm 54
 - The Firm’s Demand for Factors 55
 - The Division of National Income 58
 - ▶ **CASE STUDY** *The Black Death and Factor Prices* 60
 - The Cobb–Douglas Production Function 60
 - ▶ **CASE STUDY** *Labour Productivity as the Key Determinant of Real Wages* 62
- 3-3 What Determines the Demand for Goods and Services? 64
 - Consumption 65
 - Investment 66
 - ▶ **FYI** *The Many Different Interest Rates* 67
 - Government Purchases 68
- 3-4 What Brings the Supply and Demand for Goods and Services Into Equilibrium? 69
 - Equilibrium in the Market for Goods and Services: The Supply and Demand for the Economy’s Output 70
 - Equilibrium in the Financial Markets: The Supply and Demand for Loanable Funds 71
 - ▶ **FYI** *The Growing Gap Between Rich and Poor* 73
 - Changes in Saving: The Effects of Fiscal Policy 73
 - ▶ **CASE STUDY** *Wars and Interest Rates in the United Kingdom, 1730–1920* 74
 - ▶ **CASE STUDY** *Fiscal Policy in the 1980s and 1990s* 76
 - Changes in Investment Demand 77
- 3-5 Conclusion 79
 - ▶ **FYI** *The Identification Problem* 80

Chapter 4 Money and Inflation 85

- 4-1 What Is Money? 86
 - The Functions of Money 86
 - The Types of Money 87
 - ▶ **CASE STUDY** *Money in a POW Camp* 88
 - The Development of Fiat Money 88
 - ▶ **CASE STUDY** *Money and Social Conventions on the Island of Yap* 89
 - How the Quantity of Money Is Controlled 90
 - How the Quantity of Money Is Measured 91
 - ▶ **FYI** *How Do Credit Cards and Debit Cards Fit into the Monetary System?* 92
- 4-2 The Quantity Theory of Money 93
 - Transactions and the Quantity Equation 93
 - From Transactions to Income 94
 - The Money Demand Function and the Quantity Equation 95
 - The Assumption of Constant Velocity 96
 - Money, Prices, and Inflation 96
 - ▶ **CASE STUDY** *Inflation and Money Growth* 97
- 4-3 Seigniorage: The Revenue from Printing Money 99
 - ▶ **CASE STUDY** *American and Russian Inflations* 100
- 4-4 Inflation and Interest Rates 101
 - Two Interest Rates: Real and Nominal 101
 - The Fisher Effect 102
 - ▶ **CASE STUDY** *Inflation and Nominal Interest Rates* 103
 - Two Real Interest Rates: *Ex Ante* and *Ex Post* 104
 - ▶ **CASE STUDY** *Nominal Interest Rates in the Nineteenth Century* 105
- 4-5 The Nominal Interest Rate and the Demand for Money 105
 - The Cost of Holding Money 106
 - Future Money and Current Prices 106
 - ▶ **CASE STUDY** *Canadian Monetary Policy* 108
- 4-6 The Social Costs of Inflation 108
 - The Layman's View and the Classical Response 108
 - ▶ **CASE STUDY** *What Economists and the Public Say About Inflation* 109
 - The Costs of Expected Inflation 110
 - The Costs of Unexpected Inflation 112
 - ▶ **CASE STUDY** *The Wizard of Oz* 113
 - One Possible Benefit of Inflation 114
- 4-7 Hyperinflation 115
 - ▶ **FYI** *Keynes (and Lenin) on the Cost of Inflation* 115
 - The Costs of Hyperinflation 116
 - ▶ **CASE STUDY** *Life During the Bolivian Hyperinflation* 117
 - The Causes of Hyperinflation 118
 - ▶ **CASE STUDY** *Hyperinflation in Interwar Germany* 118
 - ▶ **CASE STUDY** *Hyperinflation in Zimbabwe* 120

- 4-8 Conclusion: The Classical Dichotomy 121
- Appendix: The Cagan Model: How Current and Future Money Affect the Price Level 126

Chapter 5 The Open Economy 129

- 5-1 The International Flows of Capital and Goods 130
 - The Role of Net Exports 130
 - Net Foreign Investment and the Trade Balance 132
 - International Flows of Goods and Capital: An Example 134
 - **FYI** *The Irrelevance of Bilateral Trade Balances* 135
- 5-2 Saving and Investment in a Small Open Economy 135
 - Capital Mobility and the World Interest Rate 135
 - The Model 138
 - How Policies Influence the Trade Balance 139
 - Evaluating Economic Policy 142
 - **CASE STUDY** *The U.S. Trade Deficit* 142
 - **CASE STUDY** *Why Doesn't Capital Flow to Poor Countries?* 145
- 5-3 Exchange Rates 146
 - Nominal and Real Exchange Rates 146
 - **FYI** *How Newspapers Report the Exchange Rate* 147
 - The Real Exchange Rate and the Trade Balance 149
 - **CASE STUDY** *Traders Respond to the Exchange Rate* 150
 - The Determinants of the Real Exchange Rate 151
 - How Policies Influence the Real Exchange Rate 152
 - The Effects of Trade Policies 154
 - **CASE STUDY** *The "Neo-Conservative" Policy Agenda in the 1980s and 1990s* 155
 - The Determinants of the Nominal Exchange Rate 157
 - **CASE STUDY** *Inflation and Nominal Exchange Rates* 158
 - The Special Case of Purchasing-Power Parity 159
 - **CASE STUDY** *The Big Mac Around the World* 161
- 5-4 Large Versus Small Open Economies 163
 - Appendix: The Open Economy in the Very Long Run 167
 - Foreign Debt 167
 - Fiscal Policy 168
 - Trickle-Down Economics 170

Chapter 6 Unemployment 175

- 6-1 Job Loss, Job Finding, and the Natural Rate of Unemployment 176
- 6-2 Job Search and Frictional Unemployment 179
 - Public Policy and Frictional Unemployment 179
 - **CASE STUDY** *Employment Insurance and the Rate of Job Finding* 181
- 6-3 Real-Wage Rigidity and Structural Unemployment 183
 - Minimum-Wage Laws 184

	Unions and Collective Bargaining	186
	Efficiency Wages	187
	▶ CASE STUDY <i>Henry Ford's \$5 Workday</i>	188
6-4	Labour Market Experience: Canada	189
	The Duration of Unemployment	189
	Variation in the Unemployment Rate Across Age Groups and Regions	190
	Trends in Unemployment	192
	▶ CASE STUDY <i>Comparing Unemployment in the United States and Canada</i>	194
6-5	Labour Market Experience: Europe	196
	The Rise in European Unemployment	197
	Unemployment Variation Within Europe	198
	▶ CASE STUDY <i>The Secrets to Happiness</i>	199
	The Rise of European Leisure	200
6-5	Conclusion	202
	Appendix: Unemployment, Inequality, and Government Policy	206
	Inequality	208
	Government Policy	209
	The Globalization Challenge	210

part III Growth Theory: The Economy in the Very Long Run

Chapter 7 Economic Growth I: Capital Accumulation and Population Growth 217

7-1	The Accumulation of Capital	218
	The Supply and Demand for Goods	219
	Growth in the Capital Stock and the Steady State	221
	Approaching the Steady State: A Numerical Example	223
	▶ CASE STUDY <i>The Miracle of Japanese and German Growth</i>	226
	How Saving Affects Growth	226
	▶ CASE STUDY <i>Saving and Investment Around the World</i>	228
7-2	The Golden Rule Level of Capital	229
	Comparing Steady States	229
	Finding the Golden Rule Steady State: A Numerical Example	233
	The Transition to the Golden Rule Steady State	234
7-3	Population Growth	237
	The Steady State with Population Growth	237
	The Effects of Population Growth	239
	▶ CASE STUDY <i>Population Growth Around the World</i>	240
	▶ CASE STUDY <i>The Aging of Canada</i>	242
	Alternative Perspectives on Population Growth	243
7-4	Conclusion	245

Chapter 8 Economic Growth II: Technology, Empirics, and Policy 249

- 8-1 Technological Progress in the Solow Model 250
 - The Efficiency of Labour 250
 - The Steady State with Technological Progress 251
 - The Effects of Technological Progress 252
- 8-2 From Growth Theory to Growth Empirics 253
 - Balanced Growth 254
 - Convergence 254
 - Factor Accumulation Versus Production Efficiency 255
 - ▶ **CASE STUDY** *Is Free Trade Good for Economic Growth?* 256
- 8-3 Policies to Promote Growth 258
 - Evaluating the Rate of Saving 258
 - Changing the Rate of Saving 259
 - ▶ **CASE STUDY** *Tax Incentives for Saving and Investment* 260
 - Allocating the Economy's Investment 263
 - Establishing the Right Institutions 264
 - ▶ **CASE STUDY** *The Colonial Origins of Modern Institutions* 265
 - Encouraging Technological Progress 266
 - ▶ **CASE STUDY** *The Worldwide Slowdown in Economic Growth: 1972–1995* 267
- 8-4 Beyond the Solow Model: Endogenous Growth Theory 270
 - The Basic Model 270
 - A Two-Sector Model 273
 - The Microeconomics of Research and Development 274
 - ▶ **CASE STUDY** *The Process of Creative Destruction* 275
- 8-5 Conclusion 276
 - Appendix: Accounting for the Sources of Economic Growth 280
 - Increases in the Factors of Production 280
 - Technological Progress 282
 - The Sources of Growth in Canada 284
 - ▶ **CASE STUDY** *Growth in the East Asian Tigers* 285
 - The Solow Residual in the Short Run 286

part IV Business Cycle Theory: The Economy in the Short Run 289

Chapter 9 Introduction to Economic Fluctuations 291

- 9-1 Time Horizons in Macroeconomics 294
 - How the Short Run and the Long Run Differ 294
 - ▶ **CASE STUDY** *If You Want to Know Why Firms Have Sticky Prices, Ask Them* 295
 - The Model of Aggregate Supply and Aggregate Demand 297

- 9-2 **Aggregate Demand** 298
 The Quantity Equation as Aggregate Demand 298
 Why the Aggregate Demand Curve Slopes Downward 299
 Shifts in the Aggregate Demand Curve 300
- 9-3 **Aggregate Supply** 301
 The Long Run: The Vertical Aggregate Supply Curve 301
 The Short Run: The Horizontal Aggregate Supply Curve 302
 From the Short Run to the Long Run 304
 ► **CASE STUDY** *A Monetary Lesson from French History* 306
 ► **FYI** *David Hume on the Real Effects of Money* 307
 ► **FYI** *The Short Run, the Long Run, and the Very Long Run* 308
- 9-4 **Stabilization Policy** 308
 Shocks to Aggregate Demand 309
 Shocks to Aggregate Supply 310
 ► **CASE STUDY** *How OPEC Helped Cause Stagflation in the 1970s* 312
- 9-5 **Conclusion** 313

Chapter 10 Aggregate Demand I: Building the *IS–LM* Model 315

- 10-1 **The Goods Market and the *IS* Curve** 317
 The Keynesian Cross 317
 ► **CASE STUDY** *Modest Expectations Concerning Job Creation* 324
 ► **CASE STUDY** *The 2009 Stimulus Package* 325
 The Interest Rate, Investment, and the *IS* Curve 327
 How Fiscal Policy Shifts the *IS* Curve 328
 A Loanable-Funds Interpretation of the *IS* Curve 330
- 10-2 **The Money Market and the *LM* Curve** 331
 The Theory of Liquidity Preference 331
 ► **CASE STUDY** *Tight Money and Rising Interest Rates* 334
 Income, Money Demand, and the *LM* Curve 334
 How Monetary Policy Shifts the *LM* Curve 335
 A Quantity-Equation Interpretation of the *LM* Curve 336
- 10-3 **Conclusion: The Short-Run Equilibrium** 337

Chapter 11 Aggregate Demand II: Applying the *IS–LM* Model 343

- 11-1 **Explaining Fluctuations with the *IS–LM* Model** 344
 How Fiscal Policy Shifts the *IS* Curve and Changes the Short-Run Equilibrium 344
 How Monetary Policy Shifts the *LM* Curve and Changes the Short-Run Equilibrium 345
 The Interaction Between Monetary and Fiscal Policy 347
 ► **CASE STUDY** *Policy Analysis with Macroeconometric Models* 349
 Shocks in the *IS–LM* Model 351

► **FYI** *What Is the Bank of Canada’s Policy Instrument—the Money Supply or the Interest Rate? And What Is Quantitative Easing?* 352

11-2 **IS–LM as a Theory of Aggregate Demand** 354

From the IS–LM Model to the Aggregate Demand Curve 354

The IS–LM Model in the Short Run and the Long Run 356

11-3 **The Great Depression** 359

The Spending Hypothesis: Shocks to the IS Curve 359

The Money Hypothesis: A Shock to the LM Curve 360

The Money Hypothesis Again: The Effects of Falling Prices 361

Could the Depression Happen Again? 363

► **CASE STUDY** *The Financial Crisis and Economic Downturn of 2008 and 2009* 364

11-4 **Conclusion** 367

► **FYI** *The Liquidity Trap* 367

Appendix: Aggregate Demand Theory Without the LM Curve 372

Aggregate Demand in a Closed Economy 372

Aggregate Demand in a Small Open Economy 375

Chapter 12 The Open Economy Revisited: The Mundell–Fleming Model and the Exchange-Rate Regime 377

12-1 **The Mundell–Fleming Model** 378

Components of the Model 379

The Model on a Y - r Graph 380

The Model on a Y - e Graph 382

12-2 **The Small Open Economy Under Floating Exchange Rates** 385

Fiscal Policy 385

Monetary Policy 386

► **CASE STUDY** *Tight Monetary Policy Combined with Loose Fiscal Policy* 387

Trade Policy 389

World Interest-Rate Changes 390

12-3 **The Small Open Economy Under Fixed Exchange Rates** 391

How a Fixed-Exchange-Rate System Works 391

► **CASE STUDY** *The International Gold Standard* 394

Fiscal Policy 394

Monetary Policy 395

► **CASE STUDY** *Devaluation and the Recovery From the Great Depression* 396

Trade Policy 396

World Interest-Rate Changes 398

Policy in the Mundell–Fleming Model: A Summary 398

► **CASE STUDY** *Regional Tensions Within Canada* 399

12-4 **Interest-Rate Differentials** 399

Country Risk and Exchange-Rate Expectations 399

Differentials in the Mundell–Fleming Model 400

- ▶ **CASE STUDY** *International Financial Crisis: Mexico 1994–1995* 402
- ▶ **CASE STUDY** *International Financial Crisis: Asia 1997–1998* 403
- 12-5 **Should Exchange Rates Be Floating or Fixed?** 404
 - Pros and Cons of Different Exchange-Rate Systems 405
 - ▶ **CASE STUDY** *Monetary Union: The Debate Over the Euro* 406
 - Speculative Attacks, Currency Boards, and Dollarization 407
 - The Impossible Trinity 408
 - ▶ **CASE STUDY** *The Chinese Currency Controversy* 409
- 12-6 **From the Short Run to the Long Run: The Mundell–Fleming Model with a Changing Price Level** 410
- 12-7 **A Concluding Reminder** 413
 - Appendix: Extensions to the Mundell–Fleming Model** 417
 - The Exchange Rate and the CPI 417
 - Flexible Domestic Prices 420
 - Exchange-Rate Expectations 421
 - An Attempt at Perspective 423

Chapter 13 **Aggregate Supply and the Short-Run Tradeoff Between Inflation and Unemployment** 425

- 13-1 **The Basic Theory of Aggregate Supply** 426
 - The Sticky-Price Model 427
 - An Alternative Theory: The Imperfect-Information Model 429
 - ▶ **CASE STUDY** *International Differences in the Aggregate Supply Curve* 430
 - Implications 431
- 13-2 **Inflation, Unemployment, and the Phillips Curve** 433
 - Deriving the Phillips Curve from the Aggregate Supply Curve 434
 - ▶ **FYI** *The History of the Modern Phillips Curve* 436
 - Adaptive Expectations and Inflation Inertia 436
 - Two Causes of Rising and Falling Inflation 437
 - The Short-Run Tradeoff Between Inflation and Unemployment 438
 - ▶ **CASE STUDY** *Inflation and Unemployment in Canada* 440
 - ▶ **FYI** *How Precise Are Estimates of the Natural Rate of Unemployment?* 442
 - Disinflation and the Sacrifice Ratio 443
 - Rational Expectations and the Possibility of Painless Disinflation 443
 - ▶ **CASE STUDY** *The Sacrifice Ratio in Practice* 445
 - Challenges to the Natural-Rate Hypothesis 447
- 13-3 **Conclusion** 451
 - Appendix: A Big, Comprehensive Model** 455
 - Special Case 1: The Classic Closed Economy 456
 - Special Case 2: The Classic Small Open Economy 456
 - Special Case 3: The Basic Model of Aggregate Demand and Aggregate Supply 456

- Special Case 4: The *IS–LM* Model 456
- Special Case 5: The Mundell–Fleming Model with a Floating Exchange Rate 456
- Special Case 6: The Mundell–Fleming Model with a Fixed Exchange Rate 457

Chapter 14 A Dynamic Model of Aggregate Demand and Aggregate Supply 459

- 14-1 Elements of the Model 460
 - Output: The Demand for Goods and Services 460
 - The Real Interest Rate: The Fisher Equation 461
 - Inflation: The Phillips Curve 462
 - Expected Inflation: Adaptive Expectations 463
 - The Nominal Interest Rate: The Monetary-Policy Rule 464
 - **CASE STUDY** *The Taylor Rule* 465
- 14-2 Solving the Dynamic Model 467
 - The Long-Run Equilibrium 468
 - The Dynamic Aggregate Supply Curve 469
 - The Dynamic Aggregate Demand Curve 470
 - The Short-Run Equilibrium 472
- 14-3 Using the Model 473
 - Long-Run Growth 474
 - A Shock to Aggregate Supply 475
 - **FYI** *The Numerical Calibration and Simulation* 476
 - A Shock to Aggregate Demand 478
 - A Shift in Monetary Policy 479
- 14-4 Two Applications: Lessons for Monetary Policy 483
 - The Tradeoff Between Output Variability and Inflation Variability 483
 - **CASE STUDY** *The United States Fed Versus the European Central Bank* 485
 - The Taylor Principle 486
 - **CASE STUDY** *What Caused the Great Inflation?* 488
- 14-5 Conclusion: Toward DSGE Models 489
 - Appendix: Components of the Synthesis 493
 - The Theory of Real Business Cycles 494
 - The Economics of Robinson Crusoe 494
 - The Interpretation of the Labour Market 496
 - The Importance of Technology Shocks 497
 - The Neutrality of Money 498
 - **CASE STUDY** *Testing for Monetary Neutrality* 498
 - The Flexibility of Wages and Prices 499
 - New Keynesian Economics 500
 - Small Menu Costs and Aggregate-Demand Externalities 500

- ▶ **CASE STUDY** *How Large are Menu Costs?* 501
- Recessions as Coordination Failure 502
- ▶ **CASE STUDY** *Experimental Evidence on Coordination Games* 504
- The Staggering of Wages and Prices 504
- Conclusion 505

part V Macroeconomic Policy Debates

Chapter 15 Stabilization Policy 511

- 15-1 Should Policy Be Active or Passive? 512
 - Lags in the Implementation and Effects of Policies 512
 - ▶ **CASE STUDY** *Profit Sharing as an Automatic Stabilizer* 514
 - The Difficult Job of Economic Forecasting 515
 - ▶ **CASE STUDY** *Two Episodes in Economic Forecasting* 515
 - Ignorance, Expectations, and the Lucas Critique 517
 - The Historical Record 518
 - ▶ **CASE STUDY** *Is the Stabilization of the Economy a Figment of the Data?* 519
- 15-2 Should Policy Be Conducted by Rule or by Discretion? 519
 - Distrust of Policymakers and the Political Process 520
 - The Time Inconsistency of Discretionary Policy 521
 - ▶ **CASE STUDY** *Alexander Hamilton Versus Time Inconsistency* 523
 - Rules for Monetary Policy 523
 - ▶ **CASE STUDY** *Inflation Targeting: Rule or Constrained Discretion?* 524
 - ▶ **CASE STUDY** *Central Bank Independence* 525
 - ▶ **CASE STUDY** *The Bank of Canada's Low-Inflation Target: Implications for Fiscal Policy* 527
- 15-3 Conclusion: Making Policy in an Uncertain World 529
 - Appendix: Time Inconsistency and the Tradeoff Between Inflation and Unemployment 532

Chapter 16 Government Debt and Budget Deficits 535

- 16-1 The Size of the Government Debt 536
 - ▶ **CASE STUDY** *Canadian Deficits and Debt: Past, Present, and Future* 539
- 16-2 Problems in Measurement 546
 - Measurement Problem 1: Inflation 546
 - Measurement Problem 2: Capital Assets 546
 - Measurement Problem 3: Uncounted Liabilities 547
 - ▶ **CASE STUDY** *Accounting for TARP* 548
 - Measurement Problem 4: The Business Cycle 549
 - Summing Up 550

16-3	The Traditional View of Government Debt	550
	▶ FYI <i>Taxes and Incentives</i>	552
16-4	The Ricardian View of Government Debt	553
	The Basic Logic of Ricardian Equivalence	553
	Consumers and Future Taxes	554
	▶ CASE STUDY <i>A Test of Ricardian Equivalence</i>	555
	▶ CASE STUDY <i>Why Do Parents Leave Bequests?</i>	557
	Making a Choice	558
	▶ FYI <i>Ricardo on Ricardian Equivalence</i>	558
16-5	Other Perspectives on Government Debt	559
	Balanced Budgets Versus Optimal Fiscal Policy	559
	Effects on Monetary Policy	560
	Debt and the Political Process	561
	International Dimensions	562
	▶ CASE STUDY <i>The Benefits of Indexed Bonds</i>	563
16-6	Conclusion	565
	Appendix: Estimating the Benefits of Deficit and Debt Reduction	568

part VI More on the Microeconomics Behind Macroeconomics

Chapter 17 Consumption 573

17-1	John Maynard Keynes and the Consumption Function	574
	Keynes's Conjectures	574
	The Early Empirical Successes	575
	Secular Stagnation, Simon Kuznets, and the Consumption Puzzle	576
17-2	Irving Fisher and Intertemporal Choice	578
	The Intertemporal Budget Constraint	578
	Consumer Preferences	580
	▶ FYI <i>Present Value, or Why a \$1,000,000 Prize Is Worth Only \$623,000</i>	581
	Optimization	582
	How Changes in Income Affect Consumption	583
	How Changes in the Real Interest Rate Affect Consumption	584
	Constraints on Borrowing	585
17-3	Franco Modigliani and the Life-Cycle Hypothesis	587
	The Hypothesis	588
	Implications	589
	▶ CASE STUDY <i>The Consumption and Saving of the Elderly</i>	590

- 17-4 Milton Friedman and the Permanent-Income Hypothesis 592
 The Hypothesis 592
 Implications 593
 ► **CASE STUDY** *Income Taxes Versus Sales Taxes as an Instrument for Stabilization Policy* 594
- 17-5 Robert Hall and the Random-Walk Hypothesis 596
 The Hypothesis 596
 Implications 597
 ► **CASE STUDY** *Do Predictable Changes in Income Lead to Predictable Changes in Consumption?* 597
- 17-6 David Laibson and the Pull of Instant Gratification 598
 The Hypothesis 599
 Implications 599
 ► **CASE STUDY** *How to Get People to Save More* 600
- 17-7 Conclusion 602

Chapter 18 Investment 605

- 18-1 Business Fixed Investment 606
 The Rental Price of Capital 607
 The Cost of Capital 608
 The Determinants of Investment 610
 ► **CASE STUDY** *The Burden of Higher Interest Rates* 612
 Taxes and Investment 613
 ► **CASE STUDY** *Canada's Experience with Corporate Tax Concessions* 614
 The Stock Market and Tobin's q 616
 ► **CASE STUDY** *The Stock Market as an Economic Indicator* 618
 Alternative Views of the Stock Market: The Efficient Markets Hypothesis Versus Keynes's Beauty Contest 619
 Financing Constraints 621
 Banking Crises and Credit Crunches 622
- 18-2 Residential Investment 623
 The Stock Equilibrium and the Flow Supply 623
 Changes in Housing Demand 624
 ► **FYI** *What Price House Can You Afford?* 626
 The Tax Treatment of Housing 626
- 18-3 Inventory Investment 627
 Reasons for Holding Inventories 627
 The Accelerator Model of Inventories 627
 How the Real Interest Rate and Credit Conditions Affect Inventory Investment 628
- 18-4 Conclusion 629

Chapter 19 Money Supply and Money Demand 633

19-1 Money Supply 633

100-Percent-Reserve Banking 634

Fractional-Reserve Banking 635

A Model of the Money Supply 637

The Instruments of Monetary Policy 639

► **CASE STUDY** *Bank Failures, Quantitative Easing, and Deposit Insurance* 642

Bank Capital, Leverage, and Capital Requirements 644

19-2 Money Demand 645

Portfolio Theories of Money Demand 646

► **CASE STUDY** *Currency and the Underground Economy* 647

Transactions Theories of Money Demand 648

The Baumol–Tobin Model of Cash Management 648

► **CASE STUDY** *Empirical Studies of Money Demand* 651

Financial Innovation and the Rise of Near Money 652

19-3 Conclusion 653

Chapter 20 The Financial System: Opportunities and Dangers 657

20-1 What Does the Financial System Do? 658

Financing Investment 658

Sharing Risk 659

Dealing with Asymmetric Information 660

Fostering Economic Growth 661

► **CASE STUDY** *Microfinance: Professor Yunus’s Profound Idea* 662

20-2 Financial Crises 663

The Anatomy of a Crisis 664

► **FYI** *The TED Spread* 666

► **CASE STUDY** *Who Should Be Blamed for the Financial Crisis of 2008–2009?* 668

Policy Responses to a Crisis 670

Policies to Prevent Crises 673

► **FYI** *CoCo Bonds* 674

► **CASE STUDY** *Did Recent Practice in Macroeconomic Policy Contribute to the Financial Crisis?* 675

► **CASE STUDY** *The European Sovereign Debt Crisis* 678

► **CASE STUDY** *Will Governments in North America Go the Way of the Indebted European Governments?* 679

20-3 Conclusion 680

Epilogue What We Know, What We Don’t 685

The Four Most Important Lessons of Macroeconomics 685

Lesson No. 1: In the long run, a country’s capacity to produce goods and services determines the standard of living of its citizens. 686

Lesson No. 2: In the short run, aggregate demand influences the amount of goods and services that a country produces. 686

Lesson No. 3: In the long run, the rate of money growth determines the rate of inflation, but it does not affect the rate of unemployment. 687

Lesson No. 4: In the short run, policymakers who control monetary and fiscal policy face a tradeoff between inflation and unemployment. 687

The Four Most Important Unresolved Questions of Macroeconomics 688

Question No. 1: How should policymakers try to promote growth in the economy's natural level of output? 688

Question No. 2: Should policymakers try to stabilize the economy? 689

Question No. 3: How costly is inflation, and how costly is reducing inflation? 690

Question No. 4: How big a problem are government budget deficits? 691

Conclusion 692

Glossary G-1

Index I-1

preface

An economist must be “mathematician, historian, statesman, philosopher, in some degree. . . as aloof and incorruptible as an artist, yet sometimes as near the earth as a politician.” So remarked John Maynard Keynes, the great British economist who, as much as anyone, could be called the father of macroeconomics. No single statement summarizes better what it means to be an economist.

As Keynes’s assessment suggests, students who aim to learn economics need to draw on many disparate talents. The job of helping students find and develop these talents falls to instructors and textbook authors. When writing this textbook for intermediate-level courses in macroeconomics, our goal was to make macroeconomics understandable, relevant, and (believe it or not) fun. Those of us who have chosen to be professional macroeconomists have done so because we are fascinated by the field. More important, we believe that the study of macroeconomics can illuminate much about the world and that the lessons learned, if properly applied, can make the world a better place. We hope this book conveys not only our profession’s accumulated wisdom but also its enthusiasm and sense of purpose.

This Book’s Approach

Although macroeconomists share a common body of knowledge, they do not all have the same perspective on how that knowledge is best taught. Let us begin this new edition by recapping four of our objectives, which together define this book’s approach to the field.

First, we try to offer a balance between short-run and long-run issues in macroeconomics. All economists agree that public policies and other events influence the economy over different time horizons. We live in our own short run, but we also live in the long run that our parents bequeathed us. As a result, courses in macroeconomics need to cover both short-run topics, such as the business cycle and stabilization policy, and long-run topics, such as economic growth, the natural rate of unemployment, persistent inflation, and the effects of government debt. Neither time horizon trumps the other.

Second, we integrate the insights of Keynesian and classical theories. Although Keynes’s *General Theory* provides the foundation for much of our current understanding of economic fluctuations, it is important to remember that classical economics provides the right answers to many fundamental questions. In this book we incorporate many of the contributions of the classical economists before Keynes and the new classical economists of the past three decades. Substantial coverage is given, for example, to the loanable-funds theory of the interest rate, the quantity theory of money, and the problem of time inconsistency. At the same

time, we recognize that many of the ideas of Keynes and the new Keynesians are necessary for understanding economic fluctuations. Substantial coverage is given also to the *IS–LM* model of aggregate demand, the short-run tradeoff between inflation and unemployment, and modern models of business-cycle fluctuations.

Third, we present macroeconomics using a variety of simple models. Instead of pretending that there is one model that is complete enough to explain all facets of the economy, we encourage students to learn how to use and compare a set of prominent models. This approach has the pedagogical value that each model can be kept relatively simple and presented within one or two chapters. More important, this approach asks students to think like economists, who always keep various models in mind when analyzing economic events or public policies.

Fourth, we emphasize that macroeconomics is an empirical discipline, motivated and guided by a wide array of experience. This book contains numerous case studies that use macroeconomic theory to shed light on real-world data or events. To highlight the broad applicability of the basic theory, we have drawn the case studies both from current issues facing the world's economies and from dramatic historical episodes. The case studies analyze the policies of Mark Carney (Governor of the Bank of Canada), our current Finance Minister, many former Canadian politicians and central bankers, government initiatives in other countries, and even the policies of Henry Ford. They teach the reader how to apply economic principles to issues from fourteenth-century Europe, the island of Yap, the land of Oz, and today's newspaper.

What's New in the Fifth Edition?

Economics instructors are vigilant in keeping their lectures up to date as the economic landscape changes. Textbook authors cannot be less so. This book is therefore revised every few years. Each revision reflects new research about the best way to understand macroeconomic developments, and discussion of the new events in the economy—especially those that have stimulated new research.

In our Fifth Edition, this general principle that guides revisions led to two major changes. First, we introduced students to the New Neoclassical Synthesis—a dynamic version of aggregate supply and demand analysis that is more explicitly based on microeconomic theory. This chapter exposed students to ideas that are prominent at the research and policy frontier. In so doing, it extended our earlier treatment of “macroeconomics without the *LM* curve” that still appears in the Appendix to Chapter 11. These discussions are all the more relevant in recent years as the zero lower bound on nominal interest rates has been an ever more binding constraint on the conduct of monetary policy. The second major addition was material on housing markets, bank capital requirements and leverage, so that the financial crisis could be understood.

We have extended both of these themes in this Fifth Edition, by adding important further material concerning the financial system, and by extending the discussion of novel monetary policies and the zero lower bound on nominal interest rates. As a result, there is a new Chapter 20 in the “More on the

Microeconomics Behind Macroeconomics” section, entitled “The Financial System: Opportunities and Dangers.” With the financial crisis and economic downturn of 2008 and 2009, economists have developed a new appreciation of the crucial linkages between the financial system and the broader economy. Chapter 20 gives students a deeper look at this topic. It begins by discussing the functions of the financial system. It then explores the causes and effects of financial crises, as well as government policies that aim to deal with crises and to prevent future ones. Since some government reactions to private-sector problems have led to sovereign debt crises, the chapter closes with material on this topic as well.

Taken together, the two new chapters added in the Fourth and Fifth Editions—that introduce students to dynamic stochastic general equilibrium (DSGE) models with simplicity and rigour, and that flesh out important features of the financial system—really do bring the book up to date. Current research is very much focused on bringing financial frictions into the DSGE framework. With these chapters, then, we hope to have addressed two goals: to better prepare students of macroeconomics to proceed with further studies, and—whether or not students pursue further study—to provide readers with a better understanding of how the financial system and the real economy interact, and, in particular, of how they have interacted in recent times.

Of course, there are many smaller updates involved in this Fifth Edition, such as the addition of the latest numbers in all the tables and graphs of historical data. Here is a list of some of the notable features of this new edition, in the order that they appear:

- ▶ Chapter 3 contains a new FYI box on the growing gap between rich and poor.
- ▶ Chapters 3 and 6 contain new references to the Billion Prices Project, which uses data found on the internet to monitor inflation trends, and to youth unemployment issues: comparing youth unemployment rates in Europe and Canada, and assessing the effect on lifetime income of entering the labour market during a recession.
- ▶ Chapter 8’s Case Study on the origins of modern institutions now contains a useful reference to the Canadian Centre for the Study of Living Standards—an interview with Daron Acemoglu and James Robinson.
- ▶ Chapter 11’s Case Study on stabilization policy has been modified to assess the credibility of the multiplier estimate that was widely used in the fiscal stimulus debates.
- ▶ Chapter 16 contains an up-to-date revision of the extended Case Study on deficit and debt reduction, and new material on the Dutch disease.
- ▶ Chapter 19 contains new material on recent monetary policies: quantitative easing in the United States and forward guidance (promises by the central bank to keep future interest rates low for a prolonged period) in Canada.

- ▶ Chapter 20 contains detailed treatment of risk aversion, asymmetric information, and moral hazard.
- ▶ Chapter 20 has FYI boxes on yield spreads and contingent convertible debt.
- ▶ Chapter 20 has Case Studies on Yunus’s creation of microfinance, the European sovereign debt crises, Minsky’s prediction that the financial crisis was certain to happen, and the fiscal challenges facing provincial governments concerning health care costs and the aging population.

As always, all the changes that we made in this Fifth Edition, and the many others that we considered, were evaluated keeping in mind the benefits of brevity. From our own experience as students, we know that long books are less likely to be read. Our goal in this book has been to offer the clearest, most up-to-date, most accessible course in macroeconomics in the fewest words possible.

The Canadian Perspective

Maintaining brevity was not our only concern as we wrote this book. We were determined to strengthen the other feature of the earlier editions that have been most appreciated by users—that the book truly integrates theory and policy. All important policy issues are covered in this way. To mention just a few:

- ▶ the role of tax incentives and disinflation in stimulating saving and investment, the importance of credibility and time-consistency,
- ▶ how the Bank of Canada pursues price stability and thereby affect the economy’s built-in stability properties,
- ▶ the reasons for the large changes in the value of the Canadian dollar,
- ▶ how the benefits of lower interest rates and lower debt can be measured,
- ▶ the spillover effects of provincial fiscal policies,
- ▶ the implications of the aging baby-boom generation,
- ▶ calculation of the “sacrifice ratio,”
- ▶ challenges to the natural-rate hypothesis,
- ▶ the different implications of unanticipated and anticipated fiscal policies,
- ▶ how fiscal policy can be used to simultaneously lower unemployment and raise productivity growth—despite the constraint imposed by globalization.

Systematically relating macro theory to the “big” issues in Canadian policy debates is one of the ways we hope to transfer our excitement about our discipline to as many readers as possible.

Finally, there are two important things concerning the new Canadian edition that are not in the book itself. Two of the many supplements are available in Canadian editions. Students will value the *Student Guide and Workbook*, and instructors will be grateful for the *Test Bank*, both of which has been revised to coordinate with this Fifth Edition.

The Arrangement of Topics

This Fifth Edition maintains the strategy of first examining the long run when prices are flexible and then examining the short run when prices are sticky. That is, it begins with classical models of the economy and explains fully the long-run equilibrium before discussing deviations from that equilibrium. Our text was the first to adopt this now-standard practice. This strategy has several advantages. First, because the classical dichotomy permits the separation of real and monetary issues, the long-run material is easier for students to understand. Second, when students begin studying short-run fluctuations, they understand fully the long-run equilibrium around which the economy is fluctuating. Third, beginning with market-clearing models makes clearer the link between macroeconomics and microeconomics. Fourth, students learn first the material that is less controversial among macroeconomists. For all these reasons, the strategy of beginning with long-run classical models simplifies the teaching of macroeconomics.

Let's now move from strategy to tactics. What follows is a whirlwind tour of the book.

Part One: Introduction

The introductory material in Part One is brief so that students can get to the core topics quickly. Chapter 1 discusses the broad questions that macroeconomists address and the economist's approach of building models to explain the world. Chapter 2 introduces the key data of macroeconomics, emphasizing gross domestic product, the consumer price index, and the unemployment rate.

Part Two: Classical Theory: The Economy in the Long Run

Part Two examines the long run over which prices are flexible. Chapter 3 presents the basic classical model of national income. In this model, the factors of production and the production technology determine the level of income, and the marginal products of the factors determine its distribution to households. In addition, the model shows how fiscal policy influences the allocation of the economy's resources among consumption, investment, and government purchases, and it highlights how the real interest rate equilibrates the supply and demand for goods and services.

Money and the price level are introduced in Chapter 4. Because prices are assumed to be fully flexible, the chapter presents the prominent ideas of classical monetary theory: the quantity theory of money, the inflation tax, the Fisher effect, the social costs of inflation, and the causes and costs of hyperinflation.

The study of open-economy macroeconomics begins in Chapter 5. Maintaining the assumption of full employment, this chapter presents models to explain the trade balance and the exchange rate. Various policy issues are addressed: the relationship between the budget deficit and the trade deficit, the macroeconomic impact of protectionist trade policies, the effect of monetary policy on the value of a currency in the market for foreign exchange, and the effects of government debt reduction and tax reform on standards of living.

Chapter 6 relaxes the assumption of full employment by discussing the dynamics of the labour market and the natural rate of unemployment. It examines various causes of unemployment, including job search, minimum-wage laws, union power, and efficiency wages. It also presents some important facts about patterns of unemployment and policy options concerning less-skilled workers.

Part Three: Growth Theory: The Economy in the Very Long Run

Part Three makes the classical analysis of the economy dynamic by developing the tools of modern growth theory. Chapter 7 introduces the Solow growth model as a description of how the economy evolves over time. This chapter emphasizes the roles of capital accumulation and population growth. Chapter 8 then adds technological progress to the Solow model. It uses the model to discuss growth experiences around the world as well as public policies that influence the level and growth of the standard of living. Finally, Chapter 8 introduces students to the modern theories of endogenous growth.

Part Four: Business Cycle Theory: The Economy in the Short Run

Part Four examines the short run when prices are sticky. It begins in Chapter 9 by introducing the model of aggregate supply and aggregate demand as well as the role of stabilization policy. Subsequent chapters refine the ideas introduced here.

Chapters 10 and 11 look more closely at aggregate demand. Chapter 10 presents the Keynesian cross and the theory of liquidity preference and uses these models as building blocks for developing the *IS–LM* model. Chapter 11 uses the *IS–LM* model to explain economic fluctuations and the aggregate demand curve. It concludes with an extended case study of the Great Depression.

The study of short-run fluctuations continues in Chapter 12, which focuses on aggregate demand in an open economy. This chapter presents the Mundell–Fleming model and shows how monetary and fiscal policies affect the economy under floating and fixed exchange-rate systems. It also discusses the debate over whether exchange rates should be floating or fixed. Several extensions to the basic model are covered in the appendix, where the zero lower bound on nominal interest rates problem is further discussed.

Chapter 13 looks more closely at aggregate supply. It examines various approaches to explaining the short-run aggregate supply curve and discusses the short-run tradeoff between inflation and unemployment and challenges to the natural-rate hypothesis.

Chapter 14 develops a dynamic model of aggregate demand and aggregate supply. It builds on ideas that students have already encountered and uses those ideas as stepping-stones to take the student close to the frontier of knowledge concerning short-run economic fluctuations. The appendix provides more discussion of recent research within the two schools of thought that lie behind this dynamic synthesis—New Classical and New Keynesian theory.

Part Five: Macroeconomic Policy Debates

Once the student has command of standard long-run and short-run models of the economy, the book uses these models as the foundation for discussing some of the key debates over economic policy. Chapter 15 considers the debate over how policymakers should respond to short-run economic fluctuations. It emphasizes two broad questions. Should monetary and fiscal policy be active or passive? Should policy be conducted by rule or by discretion? The chapter presents arguments on both sides of these questions.

Chapter 16 focuses on the various debates over government debt and budget deficits. It gives some sense of the magnitude of government indebtedness, discusses why measuring budget deficits is not always straightforward, recaps the traditional view of the effects of government debt, presents Ricardian equivalence as an alternative view, and discusses various other perspectives on government debt. As in the previous chapter, students are not handed conclusions but are given the tools to evaluate the alternative viewpoints on their own, and to evaluate the debate on the “fiscal dividend.”

Part Six: More on the Microeconomics Behind Macroeconomics

After developing theories to explain the economy in the long run and in the short run and then applying those theories to macroeconomic policy debates, the book turns to several topics that refine our understanding of the economy. The last four chapters analyze more fully the microeconomics behind macroeconomics. These chapters can be presented at the end of a course, or they can be covered earlier, depending on an instructor’s preferences.

Chapter 17 presents the various theories of consumer behaviour, including the Keynesian consumption function, Fisher’s model of intertemporal choice, Modigliani’s life-cycle hypothesis, Friedman’s permanent-income hypothesis, Hall’s random-walk hypothesis, and Laibson’s model of instant gratification. Chapter 18 examines the theory behind the investment function and the relationship between investment and the stock market. Chapter 19 provides additional material on the money market, including the role of the banking system in determining the money supply, monetary policy indicators, and the Baumol-Tobin model of money demand. Finally, the new Chapter 20 examines the financial crisis and sovereign debt challenges.

Epilogue

The book ends with a brief epilogue that reviews the broad lessons about which most macroeconomists agree and discusses some of the most important open questions. Regardless of which chapters an instructor chooses to cover, this capstone chapter can be used to remind students how the many models and themes of macroeconomics relate to one another. Here and throughout the book we emphasize that, despite the disagreements among macroeconomists, there is much that we know about how the economy works.

Alternative Routes through the Text

Although we have organized the material in the way that we prefer to teach intermediate-level macroeconomics, we understand that other instructors have different preferences. We tried to keep this in mind as we wrote the book, so that it would offer a degree of flexibility. Here are a few ways that instructors might consider rearranging the material:

- ▶ Some instructors are eager to cover short-run economic fluctuations. For such a course, we recommend covering Chapters 1 through 4 so students are grounded in the basics of classical theory and then jumping to Chapters 9 through 14 to cover the model of aggregate demand and aggregate supply.
- ▶ Some instructors are eager to cover long-run economic growth. These instructors can cover Chapters 7 and 8 immediately after Chapter 3.
- ▶ An instructor who wants to defer open-economy macroeconomics can put off Chapters 5 and 12 without loss of continuity.
- ▶ An instructor who wants to emphasize the microeconomic foundations of macroeconomics can teach chapters 17, 18, 19 and 20 early in the course, such as immediately after Chapter 6 (or even earlier).

Experience with previous editions suggests this text complements well a variety of approaches to the field.

Learning Tools

We are pleased that students have found the previous edition of this book user friendly. We have tried to make this Fifth Edition even more so.

Case Studies

Economics comes to life when it is applied to understanding actual events. Therefore, the numerous case studies (many new or revised in this edition) are important learning tools that are integrated closely with the theoretical material presented in each chapter. The frequency with which these case studies occur ensures that a student does not have to grapple with an overdose of theory before seeing the theory applied. Students report that the case studies are their favourite part of the book.

FYI Boxes

These boxes present ancillary material “for your information.” We use these boxes to clarify difficult concepts, to provide additional information about the tools of economics, and to show how economics relates to our daily lives. Several are new or revised in this edition. A particularly useful FYI box appears on the following page.

Graphs

Understanding graphical analysis is a key part of learning macroeconomics, and we have worked hard to make the figures easy to follow. We use four colours

Macroeconomic Data for Canada

While the text contains many graphs and tables containing data pertaining to the Canadian economy (see, in particular, the convenient graphs on the inside front and back covers of the book), readers of both the text and the study guide will want to have convenient access to the latest observations that emerge after these books have been published. We indicate the most straightforward options here.

The most recent observations on many major series are available on Statistics Canada's website at

<http://www.statcan.gc.ca>.

You have three options. Option 1: click on "Browse by Subject" and then the category you want (such as labour, prices, national accounts) and just follow the links, and explore which specific data most suits your needs. Option 2: type the series you want in the "search" box, for example, "unemployment rate." This will give you the most recent data and Stat Can's interpretation. Option 3: If you know the CANSIM series number (which is usually the letter "v" followed by the number given in the "source" reference for the table or graph in your textbook) type that

number (preceded by "v" with no space) into the search box. This will give you the data for as far back as it is available.

Other useful websites are:

<http://www.fin.gc.ca>

The Federal Department of Finance site has a *Frequently Asked Questions* section (under the *About Us* heading), as well as the annual *Budget* documents (each Spring) and the annual *Fiscal Update* (each fall).

<http://bankofcanada.ca>

The Bank of Canada site has very useful *Frequently Asked Questions* as well (under the *Monetary Policy* heading).

Finally, you can read recent reports on numerous macroeconomic topics by checking the recent releases tab on several economic policy think tanks. For example, Google the C.D. Howe Institute, the Institute for Research on Public Policy, the Canadian Centre for Policy Alternatives, and the Fraser Institute. Finally, the economics departments of the major chartered banks have excellent macroeconomic reports. See, for example, <http://www.td.com/economics>.

and comment boxes within figures that describe briefly and draw attention to the important points that the figures illustrate. Both innovations should help students both learn and review the material.

Mathematical Notes

We use occasional mathematical footnotes to keep more difficult material out of the body of the text. These notes make an argument more rigorous or present a proof of a mathematical result. They can easily be skipped by those students who have not been introduced to the necessary mathematical tools.

Chapter Summaries

Every chapter ends with a brief, nontechnical summary of its major lessons. Students can use the summaries to place the material in perspective and to review for exams.

Key Concepts

Learning the language of a field is a major part of any course. Within the chapter, each key concept is in **boldface** when it is introduced. At the end of the chapter, the key concepts are listed for review.

Questions for Review

After studying a chapter, students can immediately test their understanding of its basic lessons by answering the Questions for Review.

Problems and Applications

Every chapter includes Problems and Applications designed for homework assignments. Some of these are numerical applications of the theory in the chapter. Others encourage the student to go beyond the material in the chapter by addressing new issues that are closely related to the chapter topics.

Chapter Appendices

Several chapters include appendices that offer additional material, sometimes at a higher level of mathematical sophistication. These are designed so that professors can cover certain topics in greater depth if they wish. The appendices can be skipped altogether without loss of continuity.

Glossary

To help students become familiar with the language of macroeconomics, a glossary of more than 250 terms is provided at the back of the book.

Supplements for Students

Student Guide and Workbook

The study guide, by Roger Kaufman (Boston College) and William Scarth, offers various ways for students to learn the material in the text and assess their understanding.

- ▶ *Fill-In Questions* give students the opportunity to review and check their knowledge of the key terms and concepts in the chapter.
- ▶ *Multiple-Choice Questions* allow students to test themselves on the chapter material.
- ▶ *Exercises* guide students step by step through the various models using graphs and numerical examples.
- ▶ *Problems* ask students to apply the models on their own.
- ▶ *Questions to Think About* require critical thinking as well as economic analysis.
- ▶ *Data Questions* ask students to obtain and learn about readily available economic data.

Companion Website (www.worthpublishers.com/mankiw)

Students may find the following features of the site produced for the associated U.S. edition of the text useful:

- ▶ *Web Quizzes.* Students can test their knowledge of the material by taking multiple-choice tests on any chapter.

- ▶ *Student PowerPoint Slides.* Mannig Simidian has developed an animated set of tutorial slides for students. For each chapter, key points are highlighted, and students are offered another way to learn the material. Dynamic macroeconomic models come alive with shifting curves, colorful equations, graphics, and humor.
- ▶ *Web Links.* Students can access real-world information via specifically chosen hyperlinks relating to chapter content.
- ▶ *Flashcards.* Students can test their knowledge of the definitions in the glossary with these virtual flashcards.

The following items on the website pertain to the U.S. economy. Nevertheless, since much of the book covers items which are not specific to the small open economy case, Canadian students may find these items instructive:

- ▶ *Data Plotter.* Students can explore macroeconomic data with time-series graphs and scatterplots.
- ▶ *2012: A Game for Macroeconomists.* The game allows students to become President of the United States in the year 2012 and to make macroeconomic policy decisions based on news events, economic statistics, and approval ratings. It gives students a sense of the complex interconnections that influence the economy. It is also fun to play.

Supplements for Instructors

Additional supplements are available from Worth Publishers to help instructors enhance their courses.

Test Bank

Nancy Jianakopulos (Colorado State University) and William Scarth have produced a *Test Bank* that includes nearly 2,000 multiple-choice questions, numerical problems, and short-answer graphical questions to accompany each chapter of the text. The *Test Bank* is available on a CD-ROM that also includes our flexible test-generating software. Using the Diploma software, instructors can easily write and edit questions as well as create and print tests.

The following other instructor resources (produced for the associated U.S. edition of the text) may also be useful for Canadian instructors:

Instructor's Resources

Robert G. Murphy (Boston College) has revised the impressive resource manual for instructors that appears on the instructor's portion of the website. For each chapter, the manual contains notes to the instructor, a detailed lecture outline, additional case studies, and coverage of advanced topics.

Solutions Manual

Nora Underwood (University of Central Florida) has updated the *Solutions Manual* for all of the Questions for Review and Problems and Applications in the text. The manual also contains the answers to selected questions from the *Student Guide and Workbook*.

PowerPoint Slides

Ron Cronovich (Carthage College) has prepared PowerPoint presentations of the material in each chapter. They feature graphs with effective animation, careful explanations of the core material, additional case studies and data, helpful notes to the instructor, and innovative pedagogical features. Designed to be customized or used “as is,” they include easy instructions for professors who have little experience with PowerPoint. They are available on the website.

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M. Gregory Mankin

Cambridge, Massachusetts
February 2014

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Hamilton, Ontario
February 2014

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MACROECONOMICS

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PART I

Introduction

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The Science of Macroeconomics

The whole of science is nothing more than the refinement of everyday thinking.

— Albert Einstein

1-1 What Macroeconomists Study

Why have some countries experienced rapid growth in incomes over the past century while others stay mired in poverty? Why do some countries have high rates of inflation while others maintain stable prices? Why do all countries experience recessions and depressions—recurrent periods of falling incomes and rising unemployment—and how can government policy reduce the frequency and severity of these episodes? **Macroeconomics**, the study of the economy as a whole, attempts to answer these and many related questions.

To appreciate the importance of macroeconomics, you need only read the newspaper or listen to the news. Every day you can see headlines such as GDP GROWTH SLOWS, THE BANK OF CANADA MOVES TO COMBAT INFLATION, GOVERNMENT BUDGET INVOLVES RECORD DEFICIT, or STOCKS FALL AMID RECESSION FEARS. These macroeconomic events may seem abstract, but they touch all of our lives. Business executives forecasting the demand for their products must guess how fast consumers' incomes will grow. Senior citizens living on fixed incomes wonder how fast prices will rise. Recent graduates looking for jobs hope that the economy will boom and that firms will be hiring.

Because the state of the economy affects everyone, macroeconomic issues play a central role in national political debates. Voters are keenly aware of how the economy is doing, and they know that government policy can affect the economy in powerful ways. As a result, the popularity of the government often rises when the economy is doing well and falls when it is doing poorly. During the federal election of 1993, for example, Liberal strategists kept the former government on the defensive by keeping the campaign focused on the economy. Every speech included the refrain “jobs, jobs, jobs.”

Macroeconomic issues are also at the center of world politics, and if you read the international news, you will quickly start thinking about a variety of macroeconomic questions. Was it a good move for much of Europe to adopt a common currency? Why did the Canadian dollar rise in recent months?

Should China maintain a fixed exchange rate against the U.S. dollar? Why is the United States running large trade deficits? How can poor nations raise their standard of living? When world leaders meet, these topics are often high on their agenda.

Although the job of making economic policy belongs to world leaders, the job of explaining how the economy as a whole works falls to macroeconomists. Toward this end, macroeconomists collect data on incomes, prices, unemployment, and many other variables from different time periods and different countries. They then attempt to formulate general theories that help to explain these data. Like astronomers studying the evolution of stars or biologists studying the evolution of species, macroeconomists cannot conduct controlled experiments in a laboratory. Instead, they must make use of the data that history gives them. Macroeconomists observe that economies differ from one another and that they change over time. These observations provide both the motivation for developing macroeconomic theories and the data for testing them.

To be sure, macroeconomics is a young and imperfect science. The macroeconomist's ability to predict the future course of economic events is no better than the meteorologist's ability to predict next month's weather. But, as you will see, macroeconomists know quite a lot about how economies work. Since the Canadian economy is a mixture of markets and government policy involvement, this knowledge is useful both for explaining economic events and for formulating economic policy.

Every era has its own economic problems. In the 1970s, the Liberal government of Pierre Trudeau wrestled in vain with a rising rate of inflation. In the 1980s, inflation subsided, but the Conservative government of Brian Mulroney continued to struggle with large federal budget deficits. In the 1990s, as the Liberals formed the government once again, the budget deficit shrank and even turned into a small budget surplus, but federal taxes as a share of national income reached a historic high. In the early years of the new century, the federal government became increasingly focused on how productivity growth might be stimulated, and on how the challenges of increased globalization and an aging population are to be met in the coming years. Then a major recession hit—a dramatic upheaval started by mortgage defaults and the bankruptcies of several major financial institutions in the United States. The final magnitude of the downturn was uncertain as this book was going to press, but some observers feared the recession might be deep. In some minds, the financial crisis raised the spectre of the Great Depression of the 1930s; in its worst year, one out of four Canadians who wanted to work could not find a job. In 2009, officials in the Bank of Canada lowered its trend-setting overnight interest rate essentially to zero, and the federal budget set a record deficit of \$50 billion. Both of these actions were designed to prevent a recurrence of the 1930s outcome.

Macroeconomic history is not a simple story, but it provides a rich motivation for macroeconomic theory. Although the basic principles of macroeconomics do not change from decade to decade, the macroeconomist must apply these principles with flexibility and creativity to meet changing circumstances.

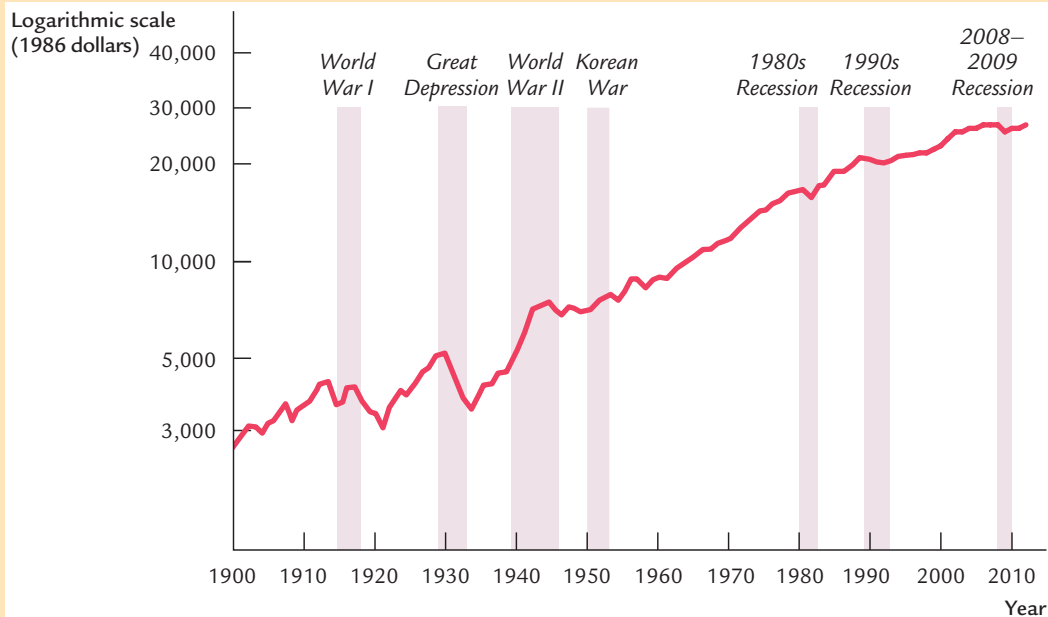
CASE STUDY

The Historical Performance of the Canadian Economy

Economists use many types of data to measure the performance of an economy. Three macroeconomic variables are particularly important: real gross domestic product (GDP), the inflation rate, and the unemployment rate. **Real GDP** measures the total income of everyone in the economy (adjusted for the level of prices). The **inflation rate** measures how quickly prices are rising. The **unemployment rate** measures the fraction of the labour force that is out of work. Macroeconomists study how these variables are determined, why they change over time, and how they interact with one another.

Figure 1-1 shows real GDP per person for the Canadian economy—widely regarded as a measure of our standard of living. Two aspects of this figure are

FIGURE 1-1



Real GDP per Person in the Canadian Economy Real GDP measures the total output of the economy. Real GDP per person measures the income of the average person in the economy.

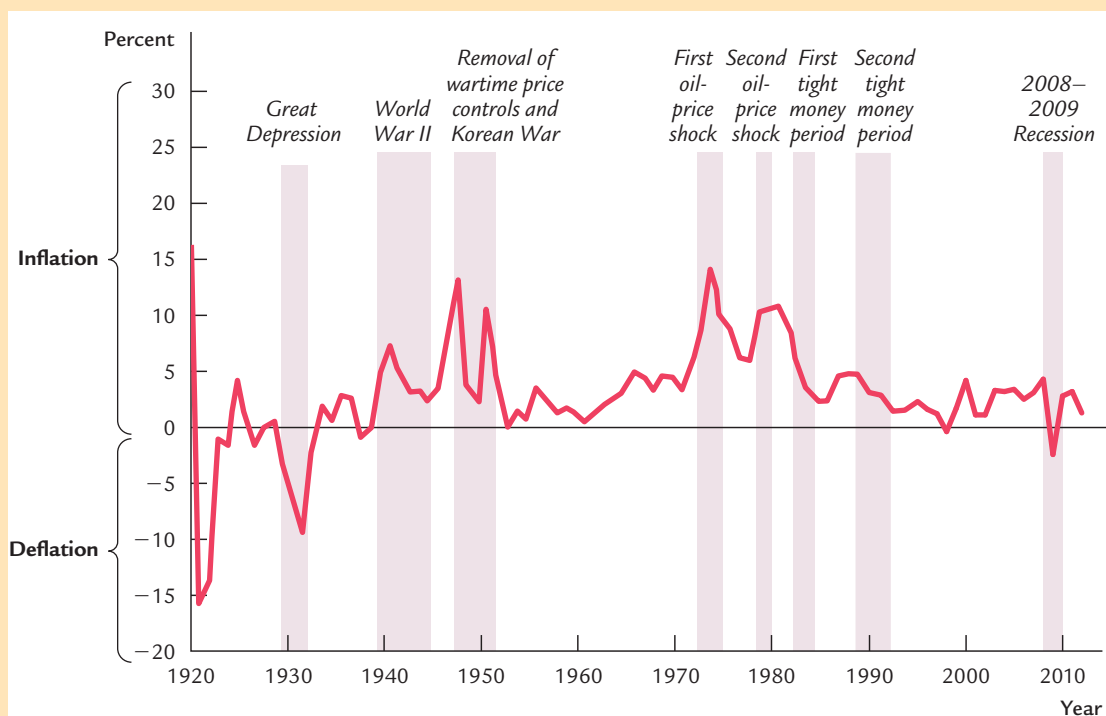
Note: Real GDP is plotted here on a logarithmic scale. On such a scale, equal distances on the vertical axis represent equal *percentage* changes. Thus, the distance between \$5,000 and \$10,000 is the same as the distance between \$10,000 and \$20,000.

Source: Reproduced and adapted by authority of the Minister of Industry, 2006. Statistics Canada CANSIM Series 1992044, 1992067 and 1; also *Canadian Economic Observer Catalogue* 11-210, (Historical Statistical Supplement 1991/92): 7, 98 and *Catalogue* 11-010 (Statistical Summary, March 1994); 4, 12; Morris Altman, “Revised Real GNP Estimates and Canadian Economic Growth, 1870–1926,” *Review of Income and Wealth*, Series 38, No. 4 (December 1992): 458–59; and *Canada 1930: A Handbook of Present Conditions and Recent Progress in the Dominion Bureau of Statistics* (Ottawa: Dominion Bureau of Statistics): 40.

noteworthy. First, real GDP grows over time. Measured in terms of 2008 market prices, real GDP per person today is about 42.2 thousand dollars—about eleven times its level in 1900. This growth in average income allows us to enjoy a *much* higher standard of living than our great-grandparents did. Second, although real GDP rises in most years, this growth is not steady. There are repeated periods during which real GDP is falling, a dramatic example being the 1930s. Such periods are called **recessions** if they are mild and **depressions** if they are more severe. Not surprisingly, periods of declining income are associated with substantial economic hardship.

Figure 1-2 shows the Canadian inflation rate. You can see that inflation varies substantially. Before 1945, the inflation rate averaged about zero. Periods of falling prices, called **deflation**, were almost as common as periods of rising prices. In more recent history, inflation has been the norm. The inflation problem became most severe during the mid-1970s, when prices rose persistently at a rate of almost 10 percent per year. Inflation returned to near zero in the 1990s, started creeping up again, then dropped during the 2008 recession.

FIGURE 1-2

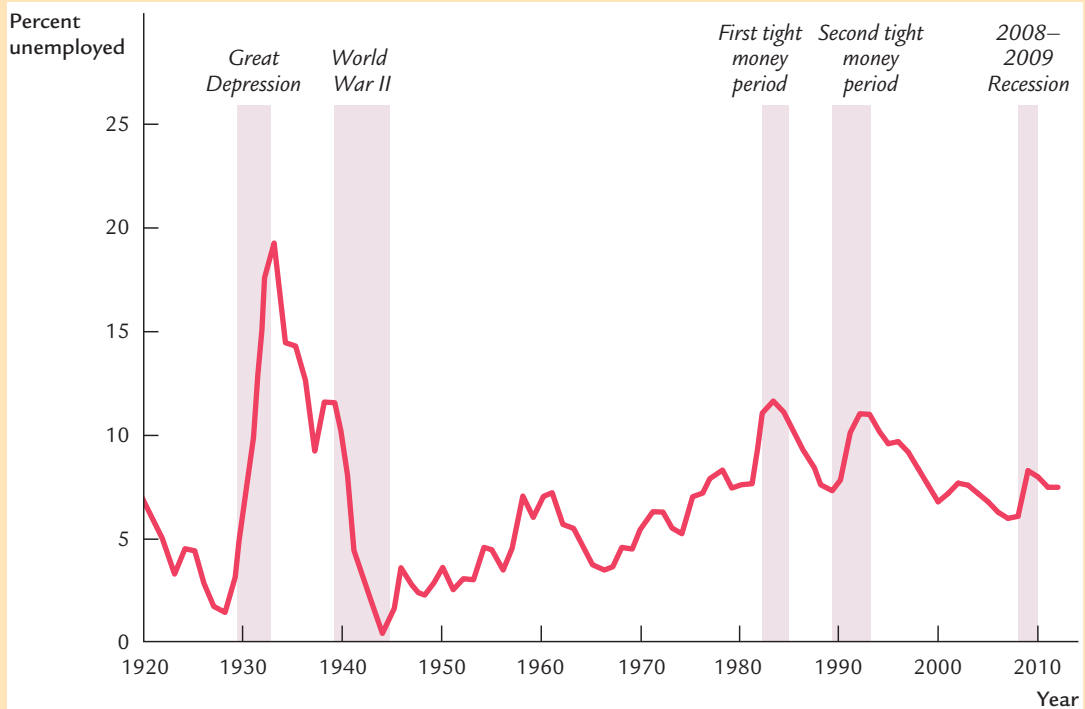


The Inflation Rate in the Canadian Economy The inflation rate measures the percentage change in the average level of prices from the year before. A negative inflation rate indicates that prices are falling.

Note: The inflation rate is measured here using the GDP deflator.

Source: Reproduced and adapted by authority of the Minister of Industry, 2006, Statistics Canada CANSIM Series 1997756; 22; Morris Altman, "Revised Real GNP Estimates and Canadian Economic Growth, 1870-1926," *Review of Income and Wealth*, Series 38, No. 4.

FIGURE 1-3



The Unemployment Rate in the Canadian Economy The unemployment rate measures the fraction of the labour that does not have a job.

Source: Reproduced and adapted by authority of the Minister of Industry, 2006, Statistics Canada, CANSIM Series 2461224, also: 16; Frank Leacy (Ed.), "Statistics Canada," *Historical Statistics of Canada, 2e*, Catalogue 11-516, Series D223, D132 (1983).

Figure 1-3 shows the Canadian unemployment rate since 1921, the first year for which data exist. This figure shows that there is always some unemployment and that the amount varies from year to year. Recessions and depressions are associated with unusually high unemployment. The highest rates of unemployment were reached during the Great Depression of the 1930s. As the figure shows, since World War II, there has been a gradual upward trend in unemployment. We will discuss the likely causes of this troubling fact in Chapter 6. Evidence for the last 15 years suggests that this disturbing trend may be starting to reverse itself.

These three figures offer a glimpse at the history of the Canadian economy. They show that unemployment falls and inflation rises when total spending is high (such as during World War II and the early 1960s), and that unemployment rises when inflation is reduced by government policy that decreases total spending (such as during the early 1980s and 1990s).

In the chapters that follow, we first discuss how these variables are measured and then explain how they behave—of course, we will look at other data as

well—such as the exchange rate, foreign trade and foreign debt—since international involvement is a key feature of the Canadian economy. We will then be in a position to evaluate the government’s fiscal policy (its changes in government spending and taxing) and its monetary policy (changes in the growth of the nation’s money supply).

1-2 How Economists Think

Although economists often study politically charged issues, they try to address these issues with a scientist’s objectivity. Like any science, economics has its own set of tools—terminology, data, and a way of thinking—that can seem foreign and arcane to the layman. The best way to become familiar with these tools is to practice using them, and this book will afford you ample opportunity to do so. To make these tools less forbidding, however, let’s discuss a few of them here.

Theory as Model Building

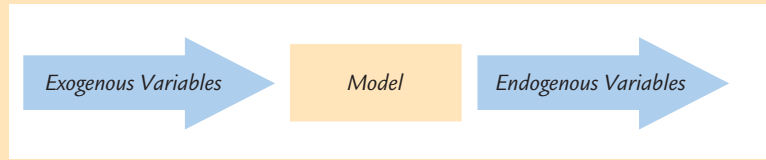
Young children learn much about the world around them by playing with toy versions of real objects. Often they put together models of, for instance, cars, trains, or planes. These models are far from realistic, but the model-builder learns a lot from them nonetheless. The model illustrates the essence of the real object it is designed to resemble. (In addition, for many children, building models is fun.)

Economists also use **models** to understand the world, but an economist’s model is more likely to be made of symbols and equations than plastic and glue. Economists build their “toy economies” to help explain economic variables, such as GDP, inflation, and unemployment. Economic models illustrate, often in mathematical terms, the relationships among the variables. Models are useful because they help us to dispense with irrelevant details and to focus on underlying connections more clearly. (In addition, for many economists, building models is fun.)

Models have two kinds of variables: endogenous variables and exogenous variables. **Endogenous variables** are those variables that a model tries to explain. **Exogenous variables** are those variables that a model takes as given. The purpose of a model is to show how the exogenous variables affect the endogenous variables. In other words, as Figure 1-4 illustrates, exogenous variables come from outside the model and serve as the model’s input, whereas endogenous variables are determined inside the model and are the model’s output.

To make these ideas more concrete, let’s review the most celebrated of all economic models—the model of supply and demand. Imagine that an economist wanted to figure out what influences the price of pizza and the quantity of pizza sold. He or she would proceed by developing a model that described the behaviour of pizza buyers, the behaviour of pizza sellers, and their interaction in the market for pizza. For example, the economist supposes that the quantity

FIGURE 1-4



How Models Work Models are simplified theories that show the key relationships among economic variables. The exogenous variables are those that come from outside the model. The endogenous variables are those that the model explains. The model shows how changes in the exogenous variables affect the endogenous variables.

of pizza demanded by consumers Q^d depends on the price of pizza P and on aggregate income Y . This relationship is expressed in the equation

$$Q^d = D(P, Y),$$

where $D()$ represents the demand function. Similarly, the economist supposes that the quantity of pizza supplied by pizzerias Q^s depends on the price of pizza P and on the price of materials P_m , such as cheese, tomatoes, flour, and anchovies. This relationship is expressed as

$$Q^s = S(P, P_m),$$

where $S()$ represents the supply function. Finally, the economist assumes that the price of pizza adjusts to bring the quantity supplied and quantity demanded into balance:

$$Q^s = Q^d.$$

These three equations compose a model of the market for pizza.

The economist illustrates the model with a supply-and-demand diagram, as in Figure 1-5. The demand curve shows the relationship between the quantity of pizza demanded and the price of pizza, holding aggregate income constant. The demand curve slopes downward because a higher price of pizza encourages consumers to switch to other foods and buy less pizza. The supply curve shows the relationship between the quantity of pizza supplied and the price of pizza, holding the price of materials constant. The supply curve slopes upward because a higher price of pizza makes selling pizza more profitable, which encourages pizzerias to incur the opportunity costs and produce more. The equilibrium for the market is the price and quantity at which the supply and demand curves intersect. At the equilibrium price, consumers choose to buy exactly the amount of pizza that pizzerias choose to produce.

This model of the pizza market has two exogenous variables and two endogenous variables. The exogenous variables are aggregate income and the price of