FREDERIC S. MISHKIN APOSTOLOS SERLETIS

THE ECONOMICS OF MONEY, BANKING, AND FINANCIAL MARKETS

SEVENTH CANADIAN EDITION

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COLUMBIA UNIVERSITY

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Brief Contents

PART 1 Introduction 1

1 Why Study Money, Banking, and Financial Markets? 2
2 An Overview of the Financial System 22
3 What Is Money? 50

PART 2 Financial Markets 66

4 The Meaning of Interest Rates 67
5 The Behaviour of Interest Rates 89
6 The Risk and Term Structure of Interest Rates 120
7 The Stock Market, the Theory of Rational Expectations, and the Efficient Market Hypothesis 146

PART 3 Financial Institutions 167

8 An Economic Analysis of Financial Structure 169
9 Economic Analysis of Financial Regulation 193
10 Banking Industry: Structure and Competition 215
11 Financial Crises 251

PART 4 The Management of Financial Institutions 280

12 Banking and the Management of Financial Institutions 281
13 Risk Management with Financial Derivatives 310

PART 5 Central Banking and the Conduct of Monetary Policy 339

14 Central Banks and the Bank of Canada 341
15 The Money Supply Process 364
16 Tools of Monetary Policy 390
17 The Conduct of Monetary Policy: Strategy and Tactics 432

PART 6 International Finance and Monetary Policy 461

18 The Foreign Exchange Market 462
19 The International Financial System 490

PART 7 Monetary Theory 518

20 Quantity Theory, Inflation, and the Demand for Money 520
21 The *IS* Curve 538
22 The Monetary Policy and Aggregate Demand Curves 557
23 Aggregate Demand and Supply Analysis 573
24 Monetary Policy Theory 608
25 The Role of Expectations in Monetary Policy 635
26 Transmission Mechanisms of Monetary Policy 655

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Contents in Detail

PART 1 Introduction 1

CHAPTER 1
Why Study Money, Banking, and Financial Markets? 2

Why Study Financial Markets? 2
- Debt Markets and Interest Rates 3
- The Stock Market 3

Why Study Financial Institutions and Banking? 5
- Structure of the Financial System 5
- Banks and Other Financial Institutions 6
- Financial Innovation 6
- Financial Crises 6

Why Study Money and Monetary Policy? 7
- Money and Business Cycles 7
- Money and Inflation 8
- Money and Interest Rates 10
- Conduct of Monetary Policy 10
- Fiscal Policy and Monetary Policy 11

Why Study International Finance? 12
- The Foreign Exchange Market 12
- The International Financial System 13

Money, Banking, and Financial Markets and Your Career 13

How We Will Study Money, Banking, and Financial Markets 14
- Exploring the Web 14

Concluding Remarks 15

Summary 15 • Key Terms 16 • Questions 16 • Applied Problems 17 • Data Analysis Problems 17 • Web Exercises 18 • Web References 18

APPENDIX TO CHAPTER 1
Defining Aggregate Output, Income, the Price Level, and the Inflation Rate 19

Aggregate Output and Income 19

Real Versus Nominal Magnitudes 19

Aggregate Price Level 20

Growth Rates and the Inflation Rate 21

CHAPTER 2
An Overview of the Financial System 22

Function of Financial Markets 22

Structure of Financial Markets 25
- Debt and Equity Markets 25
- Primary and Secondary Markets 25

Exchanges and Over-the-Counter Markets 26
Money and Capital Markets 26

Financial Market Instruments 27
Money Market Instruments 27

Following the Financial News Money Market Rates 28

Capital Market Instruments 29

Following the Financial News Capital Market Interest Rates 30

Internationalization of Financial Markets 32
International Bond Market, Eurobonds, and Eurocurrencies 32

Global Are U.S. Capital Markets Losing Their Edge? 33

World Stock Markets 34

Function of Financial Intermediaries: Indirect Finance 34

Following the Financial News Foreign Stock Market Indexes 35

Transaction Costs 35

Global The Importance of Financial Intermediaries Relative to Securities Markets: An International Comparison 36

Risk Sharing 36
Asymmetric Information: Adverse Selection and Moral Hazard 37
Economies of Scope and Conflicts of Interest 38

Types of Financial Intermediaries 39
Depository Institutions 40
Contractual Savings Institutions 41
Investment Intermediaries 41

Regulation of the Financial System 42
Increasing Information Available to Investors 43
Ensuring the Soundness of Financial Intermediaries 44
Financial Regulation Abroad 45

Summary 45 • Key Terms 46 • Questions 47 • Applied Problems 48 • Data Analysis Problems 48 • Web Exercises 48 • Web References 49

CHAPTER 3
What Is Money? 50

Meaning of Money 50

Functions of Money 51
Medium of Exchange 51
Unit of Account 52
Store of Value 53

Evolution of the Payments System 54
Commodity Money 54
Fiat Money 54
Cheques 54

Electronic Payment 55
E-Money 55

FYI Are We Headed for a Cashless Society? 56

APPLICATION Will Bitcoin Become the Money of the Future? 56

Measuring Money 57
The Bank of Canada's Monetary Aggregates 57

FYI Where Are All the Dollars? 62

Money as a Weighted Aggregate 62

Summary 63 • Key Terms 63 • Questions 63 • Applied Problems 65 • Data Analysis Problems 65 • Web Exercises 65 • Web References 65

PART 2 Financial Markets 66

CHAPTER 4 The Meaning of Interest Rates 67

Measuring Interest Rates 67
Present Value 68

APPLICATION Simple Present Value 69

APPLICATION How Much Is That Jackpot Worth? 70
Four Types of Credit Market Instruments 70
Yield to Maturity 71

APPLICATION Yield to Maturity on a Simple Loan 71

APPLICATION Yield to Maturity and the Yearly Payment on a Fixed-Payment Loan 73

APPLICATION Yield to Maturity and Bond Price for a Coupon Bond 74

APPLICATION Yield to Maturity on a Perpetuity 77

APPLICATION Yield to Maturity on a Discount Bond 77

Global Negative Interest Rates? Japan First, Then the United States, Then Europe 78

The Distinction Between Interest Rates and Returns 79
Maturity and the Volatility of Bond Returns: Interest-Rate Risk 81
Summary 82

The Distinction Between Real and Nominal Interest Rates 82

APPLICATION Calculating Real Interest Rates 84

Summary 85 • Key Terms 86 • Questions 86 • Applied Problems 87 • Data Analysis Problems 88 • Web Exercises 88 • Web References 88

MyLab ECONOMICS APPENDIX 4.1
Measuring Interest-Rate Risk: Duration

CHAPTER 5
The Behaviour of Interest Rates 89

Determinants of Asset Demand 89
Wealth 90
Expected Returns 90
Risk 90
Liquidity 91
Theory of Portfolio Choice 91

Supply and Demand in the Bond Market 92
Demand Curve 92
Supply Curve 93
Market Equilibrium 94
Supply and Demand Analysis 95

Changes in Equilibrium Interest Rates 95
Shifts in the Demand for Bonds 96
Shifts in the Supply of Bonds 99

APPLICATION Changes in the Interest Rate Due to a Change in Expected Inflation: The Fisher Effect 101

APPLICATION Changes in the Interest Rate Due to a Business Cycle Expansion ... 103

APPLICATION Explaining Current Low Interest Rates in Europe, Japan, and the United States: Low Inflation and Secular Stagnation 104

Supply and Demand in the Market for Money: The Liquidity Preference Framework 105

Changes in Equilibrium interest Rates in the Liquidity Preference Framework 108
Shifts in the Demand for Money 108
Shifts in the Supply of Money 108

APPLICATION Changes in the Equilibrium Interest Rate Due to Changes in Income, the Price Level, or the Money Supply 108
Changes in Income 109
Changes in the Price Level 110
Changes in the Money Supply 110

Money And Interest Rates 111

APPLICATION Does a Higher Rate of Growth of the Money Supply Lower Interest Rates? 112

Summary 116 • Key Terms 116 • Questions 116 • Applied Problems 118 • Data Analysis Problems 118 • Web Exercises 119 • Web References 119

MyLab ECONOMICS APPENDIX 5.1
Models of Asset Pricing

MyLab ECONOMICS APPENDIX 5.2
Applying the Asset Market Approach to a Commodity Market: The Case of Gold

MyLab ECONOMICS APPENDIX 5.3
Loanable Funds Framework

CHAPTER 6
The Risk and Term Structure of Interest Rates **120**

Risk Structure of Interest Rates 120
Default Risk 120

FYI Conflicts of Interest at Credit-Rating Agencies and the Global Financial Crisis 124

APPLICATION The Global Financial Crisis and the Baa–Treasury Spread in the United States 124
Liquidity 125
Income Tax Considerations 125
Summary 127

Term Structure of Interest Rates 127

Following the Financial News Yield Curves 127

Expectations Theory 129
Segmented Markets Theory 132
Liquidity Premium and Preferred Habitat Theories 133
Evidence on the Term Structure 135

FYI The Yield Curve as a Forecasting Tool for Inflation and the Business Cycle 137
Summary 137

APPLICATION Interpreting Yield Curves, 1986–2017 137

APPLICATION Using the Term Structure to Forecast Interest Rates 138

APPLICATION Forward Rate 141

Summary 141 • Key Terms 142 • Questions 142 • Applied Problems 144 • Data Analysis Problems 144 • Web Exercises 145 • Web References 145

CHAPTER 7
The Stock Market, the Theory of Rational Expectations, and the Efficient Market Hypothesis **146**

Computing the Price of Common Stock 146
The One-Period Valuation Model 147
The Generalized Dividend Valuation Model 148
The Gordon Growth Model 148

How the Market Sets Stock Prices 149

APPLICATION Monetary Policy and Stock Prices 151

APPLICATION The Global Financial Crisis and the Stock Market 151

The Theory of Rational Expectations 151
Formal Statement of the Theory 153
Rationale Behind the Theory 153
Implications of the Theory 154

The Efficient Market Hypothesis: Rational Expectations in Financial Markets 155
Rationale Behind the Hypothesis 156
Random-Walk Behaviour of Stock Prices 157

Global Should Foreign Exchange Rates Follow a Random Walk? 158

APPLICATION Practical Guide to Investing in the Stock Market 158
How Valuable Are Reports Published by Investment Advisers? 158

FYI Should You Hire an Ape as Your Investment Adviser? 159

Should You Be Skeptical of Hot Tips? 160
Do Stock Prices Always Rise When There Is Good News? 160
Efficient Market Prescription for the Investor 160

Why the Efficient Market Hypothesis Does not Imply That Financial Markets Are Efficient 161

APPLICATION What Do Stock Market Crashes Tell Us About the Efficient Market Hypothesis and the Efficiency of Financial Markets? 162

Behavioural Finance 162

Summary 164 • Key Terms 164 • Questions 164 • Applied Problems 165 • Data Analysis Problems 166 • Web Exercises 166 • Web References 166

PART 3 Financial Institutions 167

CHAPTER 8
An Economic Analysis of Financial Structure 169

Basic Facts about Financial Structure throughout the World 169

Transaction Costs 172
How Transaction Costs Influence Financial Structure 172
How Financial Intermediaries Reduce Transaction Costs 173

Asymmetric Information: Adverse Selection and Moral Hazard 174

The Lemons Problem: How Adverse Selection Influences Financial Structure 174
Lemons in the Stock and Bond Markets 175
Tools to Help Solve Adverse Selection Problems 175

FYI The Enron Implosion 177

How Moral Hazard Affects the Choice Between Debt and Equity Contracts 180
Moral Hazard in Equity Contracts: The Principal–Agent Problem 180
Tools to Help Solve the Principal–Agent Problem 181

How Moral Hazard Influences Financial Structure in Debt Markets 183
Tools to Help Solve Moral Hazard in Debt Contracts 183

APPLICATION Financial Development and Economic Growth 186

FYI The Tyranny of Collateral 187

APPLICATION Is China a Counterexample to the Importance of Financial Development? 188

Summary 189 • Key Terms 190 • Questions 190 • Applied Problems 191 • Data Analysis Problems 192 • Web Exercises 192 • Web References 192

CHAPTER 9
Economic Analysis of Financial Regulation 193

Asymmetric Information and the Government Safety Net 193
Government Safety Net 193

Global The Spread of Government Deposit Insurance Throughout the World: Is It a Good Thing? 195

Drawbacks of the Government Safety Net 195
Types of Financial Regulation 197
Restrictions on Asset Holdings 197
Capital Requirements 198
Prompt Corrective Action 199
Financial Supervision: Chartering and Examination 199

Global Where Is the Basel Accord Heading After the Global Financial Crisis? 200

Assessment of Risk Management 201
Disclosure Requirements 202
Consumer Protection 203
Restrictions on Competition 203
Summary 203

Global International Financial Regulation 204

CDIC Deposit Insurance Coverage 207
Differential Premiums 207
Opting Out 208
APPLICATION Evaluating CDIC Deposit Insurance Coverage and Other Proposed Reforms of the Banking Regulatory System 209
Limits on the Scope of Deposit Insurance 209
Prompt Corrective Action 210
Risk-Based Insurance Premiums 210
Other Cdic Provisions 210
Other Proposed Changes in Banking Regulations 211
Regulatory Consolidation 211
Overall Evaluation 211

Summary 212 • Key Terms 212 • Questions 212 • Applied Problems 213 • Data Analysis Problems 213 • Web Exercises 214 • Web References 214 • Web Appendices 214

MyLab ECONOMICS APPENDIX 9.1
The 1980s Canadian Banking Crisis

MyLab ECONOMICS APPENDIX 9.2
Banking Crises Throughout The World

CHAPTER 10
Banking Industry: Structure and Competition 215

Historical Development of the Canadian Banking System 215

FYI The Dual Banking System in the United States 217

The Free Banking Experiment 217
The Provincial Notes Act, 1866 218
The Dominion Notes Act, 1870 218
The First Bank Act, 1871 219
The Bank Act, 1881–1913 219
The Finance Act, 1914 220

Financial Innovation and the Growth of the "Shadow Banking System" 220
Responses to Changes in Demand Conditions: Interest-Rate Volatility 221
Responses to Changes in Supply Conditions: Information Technology 222
Securitization and the Shadow Banking System 225
Avoidance of Existing Regulations 226

FYI Bruce Bent and the Money Market Mutual Fund Panic of 2008 228

Financial Innovation and the Decline of Traditional Banking 228

Structure of the Canadian Chartered Banking Industry 231
Schedule I, Schedule II, and Schedule III Banks 231
Competition and Technology 232

Comparison with the United States 233
Restrictions on Branching 234
Response to Branching Restrictions 234

Competition Across all four Pillars 235
Convergence 235
Implications for Financial Consolidation 236
Separation of Banking and Other Financial Services Industries Throughout the World 236

FYI The Global Financial Crisis and the Demise of Large, Free-Standing Investment Banks 237

The Near Banks: Regulation and Structure 238
Trust Companies 238
Loan Companies 238
Cooperatives: Credit Unions and *Caisses Populaires* 239
Government Savings Institutions 240

International Banking 240

Global Ironic Birth of the Eurodollar Market 241

Eurocurrencies Market 241
Canadian Banking Overseas 242
Foreign Banks in Canada 242

The 2001 Bank Act Reform 244
Bank Holding Companies 244

Permitted Investments 245
Ownership Rules 245
The CP Act and Access to the Payments and Clearance System 246
Merger Review Policy 246
The National Financial Services OmbudService 247
Implications for the Canadian Banking Industry 247

Summary 247 • Key Terms 248 • Questions 249 • Data Analysis Problems 249 • Web Exercises 250 • Web References 250

CHAPTER 11
Financial Crises 251

What Is a Financial Crisis? 252
Dynamics of Financial Crises 252
Stage One: Initial Phase 252
Stage Two: Banking Crisis 254
Stage Three: Debt Deflation 255

APPLICATION The Mother of All Financial Crises: The Great Depression in the United States 256

The Global Financial Crisis of 2007–2009 258
Causes of the 2007–2009 Financial Crisis 258

FYI Collateralized Debt Obligations (CDOs) 259
Effects of the 2007–2009 Financial Crisis 260

FYI Was the Fed to Blame for the Housing Price Bubble? 262

Global The European Sovereign Debt Crisis 264
Height of the 2007–2009 Financial Crisis 265
Government Intervention and the Recovery 265

Global Worldwide Government Bailouts During the 2007–2009 Financial Crisis 267
Canada and the 2007–2009 Financial Crisis 267

FYI Canada's Asset-Backed Commercial Paper Crisis 267
Subprime Mortgages in Canada 268
Why Was Canada Exempt from the Financial Crisis? 269
Response of Financial Regulation 271
Macroprudential Versus Microprudential Supervision 271
Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 272
Too-Big-To-Fail and Future Regulation 273
What Can Be Done About the Too-Big-to-Fail Problem? 273
Beyond Dodd-Frank: Where Might Regulation Head in the Future? 274

Summary 276 • Key Terms 277 • Questions 277 • Data Analysis Problems 278 • Web Exercises 279 • Web Reference 279 • Web Chapter 279

PART 4 The Management of Financial Institutions 280

CHAPTER 12 Banking and the Management of Financial Institutions 281

The Bank Balance Sheet ... 281
Liabilities ... 281
Assets ... 283
Basic Banking ... 285
General Principles of Bank Management ... 288
Liquidity Management and the Role of Reserves ... 288
Asset Management ... 291
Liability Management ... 292
Capital Adequacy Management ... 293
APPLICATION Strategies for Managing Bank Capital ... 295
APPLICATION How a Capital Crunch Caused a Credit Crunch During the Global Financial Crisis ... 296
Managing Credit Risk ... 296
Screening and Monitoring ... 297
Long-Term Customer Relationships ... 298
Loan Commitments ... 299
Collateral and Compensating Balances ... 299
Credit Rationing ... 300
Managing Interest-Rate Risk ... 300
Gap and Duration Analysis ... 301
APPLICATION Strategies for Managing Interest-Rate Risk ... 302
Off-Balance-Sheet Activities ... 303
Loan Sales ... 303
Generation of Fee Income ... 303
Trading Activities and Risk Management Techniques ... 304
Global Barings, Daiwa, Sumitomo, Société Générale, and JPMorgan Chase: Rogue Traders and the Principal–Agent Problem 305
Summary 306 • Key Terms 307 • Questions 307 • Applied Problems 308 • Data Analysis Problems 309 • Web Exercises 309 • Web References 309

MyLab ECONOMICS APPENDIX 12.1 Duration Gap Analysis

MyLab ECONOMICS APPENDIX 12.2 Measuring Bank Performance

CHAPTER 13
Risk Management with Financial Derivatives **310**

Hedging 310
Interest-Rate Forward Contracts 311
APPLICATION Hedging with Interest-Rate Forward Contracts 311
Financial Futures Contracts and Markets 313
APPLICATION Hedging with Financial Futures 314
- Organization of Trading in Financial Futures Markets 316
- The Globalization of Financial Futures Markets 317
- Explaining the Success of Futures Markets 317

APPLICATION Hedging Foreign Exchange Risk 318
Options 320
- Stock Options 321
- Futures Options 323

APPLICATION Hedging with Futures Options 326
- Factors Affecting Option Premiums 327
- Summary 329

Swaps 329
- Interest-Rate Swap Contracts 329

APPLICATION Hedging with Interest-Rate Swaps 330
Credit Derivatives 332
- Credit Options 332
- Credit Swaps 332
- Credit-Linked Notes 333

APPLICATION Lessons from the Global Financial Crisis: When Are Financial Derivatives Likely to Be a Worldwide Ticking Time Bomb? 333

Summary 335 • Key Terms 335 • Questions 336 • Applied Problems 336 • Data Analysis Problems 337 • Web Exercises 338 • Web References 338

PART 5 Central Banking and the Conduct of Monetary Policy 339

CHAPTER 14
Central Banks and the Bank of Canada **341**

Origins of the Bank of Canada 341
Global Establishment of Selected Central Banks 342
Formal Structure of the Bank of Canada 342
The Functions of the Bank of Canada 343
FYI The Political Environment and the Bank of Canada 343
- Currency 344
- Funds Management 344

Financial System 344
Monetary Policy 345

FYI Role of the Bank's Research Staff 346

How Independent Is the Bank of Canada? 346
The Changing Face of the Bank of Canada 348
From Opaqueness to Accountability and Transparency 350
Should the Bank of Canada Be Independent? 351
The Case for Independence 351

FYI Economics and Politics 352

The Case Against Independence 352
Central Bank Independence and Macroeconomic Performance Throughout the World 353
Explaining Central Bank Behaviour 353
Structure and Independence of Foreign Central Banks 354
Federal Reserve System 354

FYI The Special Role of the Federal Reserve Bank of New York 357

European Central Bank 358
Bank of England 360
Bank of Japan 360
The Trend Toward Greater Independence 361
Summary 361 • Key Terms 362 • Questions 362 • Data Analysis Problems 363 • Web Exercises 363 • Web References 363

CHAPTER 15
The Money Supply Process 364

Three Players in the Money Supply Process 364
The Bank of Canada's Balance Sheet 365
Liabilities 365
Assets 366
Control of the Monetary Base 367
Bank of Canada Open Market Operations 367
Shifts from Deposits into Currency 368
Loans to Financial Institutions 369
Other Factors That Affect the Monetary Base 370
Overview of the Bank of Canada's Ability to Control the Monetary Base 371
Multiple Deposit Creation: A Simple Model 371
Deposit Creation: The Single Bank 371
Deposit Creation: The Banking System 373
Deriving the Formula for Multiple Deposit Creation 375
Critique of the Simple Model 377
Factors That Determine the Money Supply 378
Changes in the Nonborrowed Monetary Base, MB_n 378
Changes in Borrowed Reserves, BR, from the Bank of Canada 378
Changes in the Desired Reserve Ratio, r_d 378

Changes in Excess Reserves 378
Changes in Currency Holdings 379

Overview of the Money Supply Process 379

The Money Multiplier 379
Deriving the Money Multiplier 380
Intuition Behind the Money Multiplier 381

FYI The 2007–2009 Financial Crisis and the Money Multiplier in the United States 382

Money Supply Response to Changes in the Factors 383

APPLICATION Quantitative Easing and the Money Supply, 2007–2017 384

Summary 385 • Key Terms 386 • Questions 386 • Applied Problems 387 • Data Analysis Problems 388 • Web Exercises 388 • Web References 389 • Web Appendices 389

MyLab ECONOMICS APPENDIX 15.1
The Bank of Canada's Balance Sheet and the Monetary Base

MyLab ECONOMICS APPENDIX 15.2
The M2+ Money Multiplier

MyLab ECONOMICS APPENDIX 15.3
The Great Depression Bank Panics, 1930–1933, and the Money Supply

CHAPTER 16
Tools of Monetary Policy **390**

The Framework for the Implementation of Monetary Policy 390
The Large Value Transfer System (LVTS) 391
Non-LVTS (ACSS) Transactions 392
The Bank of Canada's Policy Rate 392
The Operating Band for the Overnight Interest Rate 393

FYI Monetary Policy Implementation in the LVTS Environment 394

The Bank of Canada's Standing Facilities 395
The Bank of Canada's Implementation of the Operating Band for the Overnight Interest Rate 396

The Market for Settlement Balances and the Channel/Corridor System for Setting the Overnight Interest Rate 396
Demand and Supply in the Market for Reserves 396
Demand Curve 396
Supply Curve 397
Market Equilibrium 398

APPLICATION How the Bank of Canada's Operating Procedures Limit Fluctuations in the Overnight Interest Rate 398

The Bank of Canada's Approach to Monetary Policy 399

FYI Price-Level Targeting Versus Inflation-Rate Targeting 400

How Monetary Policy Affects the Economy 400
Nominal Interest Rates and Monetary Policy 402

Conventional Monetary Policy Tools 403
Open Market Operations 404
Settlement Balances Management 406

APPLICATION Monetary Control in the Channel/Corridor System 409

Bank of Canada Lending 410
Operation of the Standing Lending Facility 410

FYI Emergency Lending Assistance to Troubled Banks 413

Nonconventional Monetary Policy Tools During the Global Financial Crisis 413
Liquidity Provision 414
Large-Scale Asset Purchases 415
Quantitative Easing Versus Credit Easing 415

FYI Quantitative Easing in the Channel/Corridor System 416

Forward Guidance 419
Negative Interest Rates on Banks' Deposits 419

FYI Helicopter Money 420

Monetary Policy Tools of the Federal Reserve and the European Central Bank 421
Policy Tools of the Federal Reserve 421
Monetary Policy Tools of the European Central Bank 427
Summary 428 • Key Terms 429 • Questions 429 • Applied Problems 430 • Data Analysis Problems 431 • Web Exercises 431 • Web References 431

CHAPTER 17
The Conduct of Monetary Policy: Strategy and Tactics 432

The Price Stability Goal and the Nominal Anchor 432
The Role of a Nominal Anchor 433
The Time-Inconsistency Problem 433

Other Goals of Monetary Policy 434
High Employment and Output Stability 434
Economic Growth 435
Stability of Financial Markets 435
Interest-Rate Stability 435
Stability in Foreign Exchange Markets 435

Should Price Stability Be the Primary Goal of Monetary Policy? 436
Hierarchical Versus Dual Mandates 436
Price Stability as the Primary, Long-Run Goal of Monetary Policy 437

Inflation Targeting 437
Inflation Targeting in New Zealand, Canada, and the United Kingdom 438
Advantages of Inflation Targeting 440

Global The European Central Bank's Monetary Policy Strategy 440

Disadvantages of Inflation Targeting 442

Lessons for Monetary Policy Strategy from the Global Financial Crisis 443
Implications for Inflation Targeting 444
Should Central Banks Try to Stop Asset-Price Bubbles? 445
Two Types of Asset-Price Bubbles 446
The Debate over Whether Central Banks Should Try to Pop Bubbles 447
Tactics: Choosing the Policy Instrument 450
Criteria for Choosing the Policy Instrument 452
Tactics: The Taylor Rule 453
FYI The Bank of Canada's Use of the Taylor Rule 455
FYI Bank of Canada Watchers 456

Summary 456 • Key Terms 457 • Questions 457 • Applied Problems 458 • Data Analysis Problems 459 • Web Exercises 460 • Web References 460 • Web Appendices 460

MyLab ECONOMICS APPENDIX 17.1
Monetary Targeting

MyLab ECONOMICS APPENDIX 17.2
A Brief History of Bank of Canada Policymaking

PART 6 International Finance and Monetary Policy 461

CHAPTER 18
The Foreign Exchange Market 462

Foreign Exchange Market 462
Following the Financial News Foreign Exchange Rates 463

What Are Foreign Exchange Rates? 463
Why Are Exchange Rates Important? 463
How Is Foreign Exchange Traded? 464
Exchange Rates in the Long Run 465
Theory of Purchasing Power Parity 465

APPLICATION Burgernomics: Big Macs and PPP 467

Factors That Affect Exchange Rates in the Long Run 468
Exchange Rates in the Short Run: A Supply and Demand Analysis 470
Supply Curve for Domestic Assets 471
Demand Curve for Domestic Assets 472
Equilibrium in the Foreign Exchange Market 472
Explaining Changes in Exchange Rates 473
Shifts in the Demand for Domestic Assets 473
Recap: Factors That Change the Exchange Rate 476

APPLICATION Effects of Changes in Interest Rates on the Equilibrium Exchange Rate 478

APPLICATION The Global Financial Crisis and the U.S. Dollar ... 480

APPLICATION Brexit and the British Pound ... 480

Summary 482 • Key Terms 483 • Questions 483 • Applied Problems 484 • Data Analysis Problems 484 • Web Exercises 485 • Web References 485

APPENDIX TO CHAPTER 18
The Interest Parity Condition

Comparing Expected Returns on Domestic and Foreign Assets ... 486
Interest Parity Condition ... 488

CHAPTER 19
The International Financial System **490**

Intervention in the Foreign Exchange Market ... 490
Foreign Exchange Intervention and the Money Supply ... 490
Unsterilized Intervention ... 492
Sterilized Intervention ... 493
Balance of Payments ... 494
Current Account ... 494
Financial Account ... 495

Global Should We Worry About the Large U.S. Current Account Deficit? 496

Exchange Rate Regimes in the International Financial System ... 496
Gold Standard ... 496
The Bretton Woods System ... 497
How a Fixed Exchange Rate Regime Works ... 497
Speculative Attacks ... 499

APPLICATION The Foreign Exchange Crisis of September 1992 ... 499

The Policy Trilemma ... 501

APPLICATION How Did China Accumulate $4 Trillion of International Reserves? ... 502

Monetary Unions ... 503
Managed Float ... 503

Global Will the Euro Survive? 504

Capital Controls ... 504
Controls on Capital Outflows ... 505
Controls on Capital Inflows ... 505
The Role of the IMF ... 505
Should the IMF Act as an International Lender of Last Resort? ... 506
International Considerations and Monetary Policy ... 506
Direct Effects of the Foreign Exchange Market on Monetary Policy ... 507
Exchange Rate Considerations ... 507
To Peg or Not to Peg: Exchange-Rate Targeting as an Alternative Monetary Policy Strategy ... 507
Advantages of Exchange-Rate Targeting ... 508

Disadvantages of Exchange-Rate Targeting 508
When Is Exchange-Rate Targeting Desirable for Industrialized Countries? 510
When Is Exchange-Rate Targeting Desirable for Emerging Market Countries? 511
Currency Boards 511

Global Argentina's Currency Board 512

Dollarization 513

Summary 513 • Key Terms 514 • Questions 515 • Applied Problems 516 • Data Analysis Problems 516 • Web Exercises 517 • Web References 517

PART 7 Monetary Theory 518

CHAPTER 20
Quantity Theory, Inflation, and the Demand for Money 520

Quantity Theory of Money 520
Velocity of Money and Equation of Exchange 520
From the Equation of Exchange to the Quantity Theory of Money 522
Quantity Theory and the Price Level 523
Quantity Theory and Inflation 523

APPLICATION Testing the Quantity Theory of Money 524

Budget Deficits and Inflation 526
Government Budget Constraint 526
Hyperinflation 528

APPLICATION The Zimbabwean Hyperinflation 528

Keynesian Theories of Money Demand 529
Transactions Motive 529
Precautionary Motive 529
Speculative Motive 529
Putting the Three Motives Together 529

Portfolio Theories of Money Demand 530
Theory of Portfolio Choice and Keynesian Liquidity Preference 531
Other Factors That Affect the Demand for Money 531
Summary 532

Empirical Evidence for the Demand For Money 532
Interest Rates and Money Demand 533
Stability of Money Demand 533

Summary 534 • Key Terms 534 • Questions 535 • Applied Problems 536 • Data Analysis Problems 536 • Web Exercises 537 • Web References 537 • Web Appendices 537

MyLab ECONOMICS APPENDIX 20.1
The Baumol-Tobin and the Tobin Mean-Variance Models of the Demand for Money

MyLab ECONOMICS APPENDIX 20.2
Empirical Evidence on the Demand for Money

CHAPTER 21
The IS Curve 538

Planned Expenditure and Aggregate Demand 538
The Components of Aggregate Demand 539
Consumption Expenditure 539

FYI Meaning of the Word *Investment* 540

Planned Investment Spending 540
Net Exports 542
Real Interest Rates and Net Exports 542
Government Purchases and Taxes 543
Goods Market Equilibrium 544
Solving for Goods Market Equilibrium 544
Deriving the *IS* Curve 545
Understanding the *IS* Curve 545
What the *IS* Curve Tells Us: Intuition 545
What the *IS* Curve Tells Us: Numerical Example 545
Why the Economy Heads Toward Equilibrium 547
Factors That Shift the *IS* Curve 547
Changes in Government Purchases 547

APPLICATION The Vietnam War Buildup, 1964–1969 548

Changes in Taxes 549

APPLICATION The American Fiscal Stimulus Package of 2009 550

Changes in Autonomous Spending 551
Changes in Financial Frictions 552
Summary of Factors That Shift the *IS* Curve 553

Summary 553 • Key Terms 553 • Questions 554 • Applied Problems 555 • Data Analysis Problems 556 • Web Exercises 556 • Web ReferenceS 556

CHAPTER 22
The Monetary Policy and Aggregate Demand Curves 557

The Bank of Canada and Monetary Policy 557
The Monetary Policy Curve 558
The Taylor Principle: Why the Monetary Policy Curve Has an Upward Slope 558
Shifts in the *MP* Curve 560
Movements Along Versus Shifts in the *MP* Curve 560

APPLICATION Movement Along the *MP* Curve: The Rise in the Federal Funds Rate Target, 2004–2006 561

APPLICATION Shift in the *MP* Curve: Autonomous Monetary Easing at the Onset of the Global Financial Crisis ... 562

The Aggregate Demand Curve ... 563
Deriving the Aggregate Demand Curve Graphically ... 563

FYI Deriving the Aggregate Demand Curve Algebraically 564

Factors That Shift the Aggregate Demand Curve ... 564

Summary 569 • Key Terms 569 • Questions 569 • Applied Problems 570 • Data Analysis Problems 571 • Web Exercises 572 • Web References 572

CHAPTER 23
Aggregate Demand and Supply Analysis 573

Aggregate Demand ... 573
Deriving the Aggregate Demand Curve ... 574

Following the Financial News Aggregate Output, Unemployment, and Inflation 574

Factors That Shift the Aggregate Demand Curve ... 575

FYI What Does *Autonomous* Mean? 576

Aggregate Supply ... 579
Long-Run Aggregate Supply Curve ... 579
Short-Run Aggregate Supply Curve ... 579
Price Stickiness and the Short-Run Aggregate Supply Curve ... 581

Shifts in the Aggregate Supply Curves ... 581
Shifts in the Long-Run Aggregate Supply Curve ... 581
Shifts in the Short-Run Aggregate Supply Curve ... 582

Equilibrium in Aggregate Demand and Supply Analysis ... 586
Short-Run Equilibrium ... 586
How the Short-Run Equilibrium Moves to the Long-Run Equilibrium over Time ... 587
Self-Correcting Mechanism ... 589

Changes in Equilibrium: Aggregate Demand Shocks ... 589

APPLICATION The Bank of Canada Disinflation, 1981–1985 ... 590

APPLICATION Negative Demand Shocks in the United States, 2001–2004 ... 592

Changes in Equilibrium: Aggregate Supply (Inflation) Shocks ... 592
Temporary Supply Shocks ... 592

APPLICATION Negative Supply Shocks, 1973–1975 and 1978–1980 ... 595

Permanent Supply Shocks and Real Business-Cycle Theory ... 595

APPLICATION Positive Supply Shocks, 1995–1999 ... 598

Conclusions ... 599

AD/AS Analysis of Foreign Business-Cycle Episodes ... 599

APPLICATION Negative Supply and Demand Shocks and the 2007–2009 Financial Crisis 599

APPLICATION The United Kingdom and the 2007–2009 Financial Crisis 601

APPLICATION China and the 2007–2009 Financial Crisis 601

Summary 604 • Key Terms 605 • Questions 605 • Applied Problems 606 • Data Analysis Problems 606 • Web Exercises 607 • Web References 607

MyLab ECONOMICS APPENDIX 23.1
The Effects of Macroeconomic Shocks on Asset Prices

MyLab ECONOMICS APPENDIX 23.2
Aggregate Demand and Supply: A Numerical Example

MyLab ECONOMICS APPENDIX 23.3
The Algebra of the Aggregate Demand and Supply Model

MyLab ECONOMICS APPENDIX 23.4
The Taylor Principle and Inflation Stability

CHAPTER 24
Monetary Policy Theory **608**

Response of Monetary Policy to Shocks 608
- Response to an Aggregate Demand Shock 609
- Response to a Permanent Supply Shock 611
- Response to a Temporary Supply Shock 613
- The Bottom Line: The Relationship Between Stabilizing Inflation and Stabilizing Economic Activity 616

How Actively Should Policymakers Try to Stabilize Economic Activity? 616
- Lags and Policy Implementation 616

FYI The Activist/Nonactivist Debate Over the Obama Fiscal Stimulus Package 617

Inflation: Always and Everywhere a Monetary Phenomenon 618

Causes of Inflationary Monetary Policy 619
- High Employment Targets and Inflation 619

Monetary Policy at the Zero Lower Bound 622
- Deriving the Aggregate Demand Curve with the Zero Lower Bound 622
- The Disappearance of the Self-Correcting Mechanism at the Zero Lower Bound 624

APPLICATION Nonconventional Monetary Policy and Quantitative Easing 625

- Liquidity Provision 626
- Asset Purchases and Quantitative Easing 626
- Management of Expectations 628

APPLICATION Abenomics and the Shift in Japanese Monetary Policy in 2013 629

Summary 631 • Key Terms 632 • Questions 632 • Applied Problems 633 • Data Analysis Problems 633 • Web Exercises 634 • Web Reference 634

CHAPTER 25
The Role of Expectations in Monetary Policy 635

Lucas Critique of Policy Evaluation 635

Econometric Policy Evaluation 636

APPLICATION The Term Structure of Interest Rates 636

Policy Conduct: Rules or Discretion? 637

- Discretion and the Time-Inconsistency Problem 637
- Types of Rules 638
- The Case for Rules 638

FYI The Political Business Cycle and Richard Nixon 639

- The Case for Discretion 639

Global The Demise of Monetary Targeting in Switzerland 640

- Constrained Discretion 640

The Role of Credibility and a Nominal Anchor 641

- Benefits of a Credible Nominal Anchor 641
- Credibility and Aggregate Demand Shocks 641
- Credibility and Aggregate Supply Shocks 644

APPLICATION A Tale of Three Oil Price Shocks 645

- Credibility and Anti-Inflation Policy 647

Global Ending the Bolivian Hyperinflation: A Successful Anti-Inflation Program 648

APPLICATION Credibility and the Bank of Canada's Victory Over Inflation 649

Approaches to Establishing Central Bank Credibility 649

- Nominal GDP Targeting 650
- Appoint "Conservative" Central Bankers 650

Summary 651 • Key Terms 651 • Questions 652 • Applied Problems 653 • Data Analysis Problems 653 • Web Exercises 654

CHAPTER 26
Transmission Mechanisms of Monetary Policy 655

Transmission Mechanisms of Monetary Policy 655

- Traditional Interest-Rate Channels 656
- Other Asset Price Channels 657
- Credit View 660

FYI Consumers' Balance Sheets and the Great Depression 662

- Why Are Credit Channels Likely to Be Important? 663

APPLICATION The Great Recession 663
Lessons for Monetary Policy 664
APPLICATION Applying the Monetary Policy Lessons to Japan's Two Lost Decades 666

Summary 667 • Key Terms 667 • Questions 667 • Applied Problems 669 • Data Analysis Problems 669 • Web Exercises 669 • Web References 670 • Web Appendices 670

MyLab ECONOMICS APPENDIX 26.1
Evaluating Empirical Evidence: The Debate Over the Importance of Money in Economic Fluctuations

Glossary **G-1**

Index **I-1**

Preface

There has never been a more exciting time to teach money and banking. The recent worldwide financial crisis and its aftermath cast a spotlight on the importance of banks, financial markets, and monetary policy to the health of our economy. Rick Mishkin experienced this firsthand when he served as a governor of the Federal Reserve System from 2006 to 2008, and in this book, we emphasize the rich tapestry of recent economic events to enliven the study of money, banking, and financial markets.

NEW TO THIS EDITION

Although this text has undergone a major revision, it retains the basic hallmarks that have made it the best-selling textbook on money and banking over the past 11 editions in the United States and the past 6 editions in Canada. As with past editions, this edition uses basic economic principles to explain financial markets, financial institutions, and monetary policy with rigor and clarity. With each edition, we update content and features based on market feedback from economics professors and students using the book as well as the latest world financial episodes. For the past several editions, the digital assets for this book, which are available on MyLab Economics, have evolved and expanded.

New Content

New developments in the money and banking field have prompted us to add the following new sections, boxes, and applications that keep the text current:

- A new section on money, banking, and financial markets and your career (Chapter 1) to show students how the study of money, banking, and financial markets can help advance their career, even if they do not end up working on Bay Street or in a bank.
- A new Global box on negative interest rates in Japan, the United States, and Europe (Chapter 4) illustrates that, although it is normal for interest rates to be positive, recently we have seen negative interest rates in a number of countries.
- A new application on how low inflation and secular stagnation can explain low interest rates in Europe, Japan, and the United States (Chapter 5) shows how the supply and demand model explains current interest rate movements.
- A new section on where regulation might head in the future (Chapter 11) discusses current debates on financial regulation.
- A new section on negative interest rates on banks' deposits at the central bank (Chapter 16) describes this new, nonconventional monetary policy tool and how effective it might be.
- A new section on interest on reserves paid by the European Central Bank (Chapter 16) describes this important policy tool of the ECB.
- A revised discussion of the theory of purchasing power parity and why it does not fully explain exchange rates in the short run (Chapter 18) provides a clearer presentation than in the previous edition.
- A new application on Burgernomics, Big Macs, and Purchasing Power Parity (Chapter 18) is a fun way of showing students how purchasing power parity works in practice.

- A new application on Brexit and the British pound (Chapter 18) discusses the controversial exit of Britain from the euro and why it had such a big impact on the value of the British currency.
- A revised section on the balance of payments (Chapter 19) provides a clearer discussion of the key items in the balance of payments that students hear about in the media.
- A revised global box on whether we should worry about the large U.S. current account deficit (Chapter 19) helps students interpret claims made about the current account in both the media and by politicians.
- Figures and tables have been updated with data through 2017, and a number of end-of-chapter problems in each chapter are updated or new.

SOLVING TEACHING AND LEARNING CHALLENGES

It's important for students to understand the models, key terms, and equations in any economics textbook. However, students can get bogged down in this detail and miss the bigger picture. The content, structure, and features of this book were designed based on market feedback and many years of teaching experience to build students' skill in applying these elements—models, terms, and equations—to real-world events. Students also learn to apply what they learn to decisions that are directly relevant to their lives, such as what might happen to interest rates on car loans or mortgages, and why events might affect the unemployment rate, which can have a major impact on how easy it is for them to get a job.

Hallmark Learning Features

Here is an overview of the hallmark features of the book that solve teaching problems and facilitate student learning.

- A **unifying, analytic framework** uses a few basic economic principles that enable students to develop a disciplined, logical way of analyzing the structure of financial markets and understanding foreign exchange changes, financial institution management, and the role of monetary policy in the economy.
- A **careful, step-by-step development of economic models** (the approach used in the best principles of economics textbooks) makes it easier for students to learn.
- **Graphs and figures** with detailed captions help students clearly understand the interrelationships among the plotted variables and the principles of analysis. On MyLab Economics, many of the text's figures are available as mini-lectures that build up each graph step by step and explain the intuition necessary to fully understand the theory behind the graph. The mini-lectures are an invaluable study tool for students who typically learn better when they see and hear economic analysis rather than read it.
- The use of **Global boxes** provides a complete integration of an international perspective throughout the text. These present interesting material with an international focus.
- **Applications,** numbering more than 50, demonstrate how the analysis presented can be used to explain many important real-world situations.
- **FYI boxes** highlight dramatic historical episodes, interesting ideas, and intriguing facts related to the content of the chapter.

- **Following the Financial News** boxes introduce students to relevant news articles and data that are reported daily in the press, and teach students how to interpret these data.
- **End-of-chapter questions and applied problems**, numbering more than 600, help students learn the subject matter by applying economic concepts.
- **Data analysis problems** ask students to apply actual data from the CANSIM database or the St. Louis Federal Reserve Bank's FRED database to specific problems so that they can understand what is happening.
- **Dynamic Study Modules**, available in MyLab Economics, work by continuously assessing a student's performance and activity, then using data and analytics to provide personalized content in real-time to reinforce concepts that target the student's particular strengths and weaknesses. The Dynamic Study Modules for this edition were created specifically to match the content of the text, enabling a seamless transition from reading it to applying the concepts with immediate, personalized feedback.
- **Mini-Cases** on MyLab Economics present unique economics scenarios and questions that provide real-life context for key chapter concepts.

FLEXIBILITY AND MODULARITY

In using previous editions, adopters, reviewers, and survey respondents have continually praised this text's flexibility and modularity—that is, the option to pick and choose which chapters to cover and in what order to cover them. Flexibility and modularity are especially important in the money and banking course because there are as many ways to teach this course as there are instructors. To satisfy the diverse needs of instructors, the text achieves flexibility as follows:

- Core chapters provide the basic analysis used throughout the book, and other chapters or sections of chapters can be used or omitted according to instructor preferences. For example, Chapter 2 introduces the financial system and basic concepts such as transaction costs, adverse selection, and moral hazard. After covering Chapter 2, the instructor may decide to give more detailed coverage of financial structure by assigning Chapter 8 or may choose to skip Chapter 8 and take any of a number of different paths through the book.
- The text allows instructors to cover the most important issues in monetary theory even if they do not wish to present a detailed development of the *IS, MP,* and *AD* curves (provided in Chapters 21 and 22). Instructors who want to teach a more complete treatment of monetary theory can make use of these chapters.
- Part 7 on monetary theory can easily be taught before Part 5 of the text if the instructor wishes to give students a deeper understanding of the rationale behind monetary policy.
- Chapter 26 on the transmission mechanisms of monetary policy can be taught at many different points in the course—either with Part 5, when monetary policy is discussed, or with Chapter 21 or Chapter 23, when the concept of aggregate demand is developed. Transmission mechanisms of monetary policy can also be taught as a special topic at the end of the course.
- The international approach of the text, accomplished through marked international sections within chapters as well as separate chapters on the foreign exchange market and the international monetary system, is comprehensive yet flexible. Although many instructors will teach all the international material, others will not. Instructors who wish to put less emphasis on international topics can easily skip

Chapter 18 on the foreign exchange market and Chapter 19 on the international financial system and monetary policy. The international sections within chapters are self-contained and can be omitted with little loss of continuity.

To illustrate how this book can be used for courses with varying emphases, several course outlines are suggested for a one-semester teaching schedule. More detailed information about how the text can be used flexibly in your course is available in the Instructor's Manual.

- *General Money and Banking Course:* Chapters 1–5, 9–14, 16, 17, 23–24, with a choice of 5 of the remaining 12 chapters
- *General Money and Banking Course with an International Emphasis:* Chapters 1–5, 9–14, 16–19, 23–24, with a choice of 3 of the remaining 10 chapters
- *Financial Markets and Institutions Course:* Chapters 1–13, with a choice of 8 of the remaining 13 chapters
- *Monetary Theory and Policy Course:* Chapters 1–5, 14–17, 20–25, with a choice of 4 of the remaining 11 chapters

MyLab Economics Appendices

The Seventh Canadian Edition of *The Economics of Money, Banking, and Financial Markets* includes 20 appendices available on MyLab Economics that cover additional topics and more technical material that instructors might want to include in their courses.

Instructors can either use the following appendices in class to supplement the material in the textbook or recommend them to students who want to expand their knowledge of the money and banking field. Please find them at www.pearson.com/mylab.

MyLab Economics Appendix 4.1	Measuring Interest-Rate Risk: Duration
MyLab Economics Appendix 5.1	Models of Asset Pricing
MyLab Economics Appendix 5.2	Applying the Asset Market Approach to a Commodity Market: The Case of Gold
MyLab Economics Appendix 5.3	Loanable Funds Framework
MyLab Economics Appendix 9.1	The 1980s Canadian Banking Crisis
MyLab Economics Appendix 9.2	Banking Crises Throughout the World
MyLab Economics Appendix 12.1	Duration Gap Analysis
MyLab Economics Appendix 12.2	Measuring Bank Performance
MyLab Economics Appendix 15.1	The Bank of Canada's Balance Sheet and the Monetary Base
MyLab Economics Appendix 15.2	The M2+ Money Multiplier
MyLab Economics Appendix 15.3	The Great Depression Bank Panics, 1930–1933, and the Money Supply
MyLab Economics Appendix 17.1	Monetary Targeting
MyLab Economics Appendix 17.2	A Brief History of Bank of Canada Policymaking
MyLab Economics Appendix 20.1	The Baumol-Tobin and the Tobin Mean-Variance Models of the Demand for Money
MyLab Economics Appendix 20.2	Empirical Evidence on the Demand for Money

MyLab Economics Appendix 23.1	The Effects of Macroeconomic Shocks on Asset Prices
MyLab Economics Appendix 23.2	Aggregate Demand and Supply: A Numerical Example
MyLab Economics Appendix 23.3	The Algebra of the Aggregate Demand and Supply Model
MyLab Economics Appendix 23.4	The Taylor Principle and Inflation Stability
MyLab Economics Appendix 26.1	Evaluating Empirical Evidence: The Debate Over the Importance of Money in Economic Fluctuations

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Although we have done our best to make this edition as complete and error free as possible, as most of you know, perfection is impossible. We would greatly appreciate any suggestions for improvement.

Please send your comments to serletis@ucalgary.ca.

Frederic S. Mishkin
Apostolos Serletis
2018

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PART 1

Introduction

CHAPTER 1 Why Study Money, Banking, and Financial Markets?
CHAPTER 2 An Overview of the Financial System
CHAPTER 3 What Is Money?

Crisis and Response: Global Financial Crisis and Its Aftermath

In August 2007, financial markets began to seize up, and over the next two years the world economy experienced a global financial crisis that was the most severe since the Great Depression years of the 1930s. The financial crisis started in the United States and was the result of a credit-driven, asset-price bubble in the U.S. housing market. When that bubble burst, housing prices in the United States plummeted, the stock market crashed, unemployment skyrocketed, and both businesses and households found they couldn't get credit. Not only did the central bank of the United States, the Federal Reserve, respond by sharply lowering interest rates and intervening in credit markets to provide them with massive amounts of liquidity but also governments around the world worked on full-scale banking bailouts and rescue packages adding up to trillions of dollars. However, even with these aggressive actions aimed at stabilizing the financial system and boosting the economy, 10 years after the crisis economies throughout the world are still experiencing problems, and the finances of many governments are in tatters.

The global financial crisis and its aftermath demonstrate the importance of banks and financial systems to economic well-being as well as the major role of money in the economy. Part I of this book provides an introduction to the study of money, banking, and financial markets. Chapter 1 outlines a road map of the book and discusses why it is so worthwhile to study money, banking, and financial markets. Chapter 2 provides a general overview of the financial system. Chapter 3 then explains what money is and how it is measured.

Georgios Kollidas/Shutterstock

1 Why Study Money, Banking, and Financial Markets?

Learning Objectives

1.1 Recognize the importance of financial markets in the economy.

1.2 Describe how financial intermediation and financial innovation affect banking and the economy.

1.3 Identify the basic links among monetary policy, the business cycle, and economic variables.

1.4 Explain the importance of exchange rates in a global economy.

1.5 Explain how the study of money, banking, and financial markets may advance your career.

1.6 Describe how the text approaches the teaching of money, banking, and financial markets.

Preview

You have just heard on the evening news that the Bank of Canada is raising the overnight interest rate by one-half of a percentage point. What effect might this have on the interest rate of an automobile loan when you finance your purchase of a sleek new sports car? Does it mean that a house will be more or less affordable in the future? Will it make it easier or harder for you to get a job next year?

This book provides answers to these and other questions by examining how financial markets (such as those for bonds, stocks, and foreign exchange) and financial institutions (banks, insurance companies, mutual funds, and other institutions) work and by exploring the role of money in the economy. Financial markets and institutions affect not only your everyday life but also the flow of trillions of dollars of funds throughout our economy, which in turn affects business profits, the production of goods and services, and even the economic well-being of countries other than Canada. What happens to financial markets, financial institutions, and money is of great concern to politicians and can have a major impact on elections. The study of money, banking, and financial markets will reward you with an understanding of many exciting issues. In this chapter, we provide a road map of this book by outlining these issues and exploring why they are worth studying.

WHY STUDY FINANCIAL MARKETS?

Part 2 of this book focuses on **financial markets**—markets in which funds are transferred from people who have an excess of available funds to people who have a shortage. Financial markets, such as bond and stock markets, are crucial to promoting greater economic efficiency by channelling funds from people who do not have a productive use for them to those who do. Indeed, well-functioning financial markets are a key factor in producing high economic growth, and poorly performing financial markets are one reason that many countries in the world remain desperately poor. Activities in financial markets also have a direct effect on personal wealth, the behaviour of businesses and consumers, and the cyclical performance of the economy.

Debt Markets and Interest Rates

A **security** (also called a *financial instrument*) is a claim on the issuer's future income or **assets** (any financial claim or piece of property that is subject to ownership). A **bond** is a debt security that promises to make periodic payments for a specified period of time.[1] Debt markets, also often generically referred to as *bond markets*, are especially important to economic activity because they enable corporations and governments to borrow money to finance their activities and because it is where interest rates are determined. An **interest rate** is the cost of borrowing, or the price paid for the rental of funds (usually expressed as a percentage of the rental of $100 per year). Many types of interest rates are found in the economy—mortgage interest rates, car loan rates, and interest rates on many different types of bonds.

Interest rates are important on a number of levels. On a personal level, high interest rates might deter you from buying a house or a car because the cost of financing would be high. Conversely, high interest rates might encourage you to save because you can earn more interest income by putting aside some of your earnings as savings. On a more general level, interest rates have an impact on the overall health of the economy because they affect not only consumers' willingness to spend or save but also businesses' investment decisions. High interest rates, for example, might cause a corporation to postpone building a new plant that would provide more jobs.

Because changes in interest rates affect individuals, financial institutions, businesses, and the overall economy, it is important to explain substantial fluctuations in interest rates over the past 40 years. For example, the interest rate on three-month Treasury bills peaked at over 20% in August 1981. This interest rate then fell to less than 3% in 1997, rose to near 5% in the late 1990s, fell to a low of 2% in the early 2000s, rose to above 4% by 2007, fell to near zero in 2009, and then began rising again to close to 1%.

Because different interest rates have a tendency to move in unison, economists frequently lump interest rates together and refer to "the" interest rate. As Figure 1-1 shows, however, interest rates on several types of bonds can differ substantially. The interest rate on three-month Treasury bills, for example, fluctuates more than the other interest rates and is lower on average. The interest rate on long-term corporate bonds is higher on average than the other interest rates, and the spread between it and the other rates fluctuates over time.

In Chapter 2, we study the role of bond markets in the economy, and in Chapters 4 through 6, we examine what an interest rate is, how the common movements in interest rates come about, and why the interest rates on different bonds vary.

The Stock Market

A **common stock** (typically called simply a **stock**) represents a share of ownership in a corporation. It is a security that is a claim on the earnings and assets of the corporation. Issuing stock and selling it to the public is a way for corporations to raise funds to finance their activities. The stock market, in which claims on the earnings of

[1]The definition of *bond* used throughout this book is the broad one commonly used in academic settings, which covers both short- and long-term debt instruments. However, some practitioners in financial markets use the word *bond* to describe only specific long-term debt instruments such as corporate bonds or Government of Canada bonds.

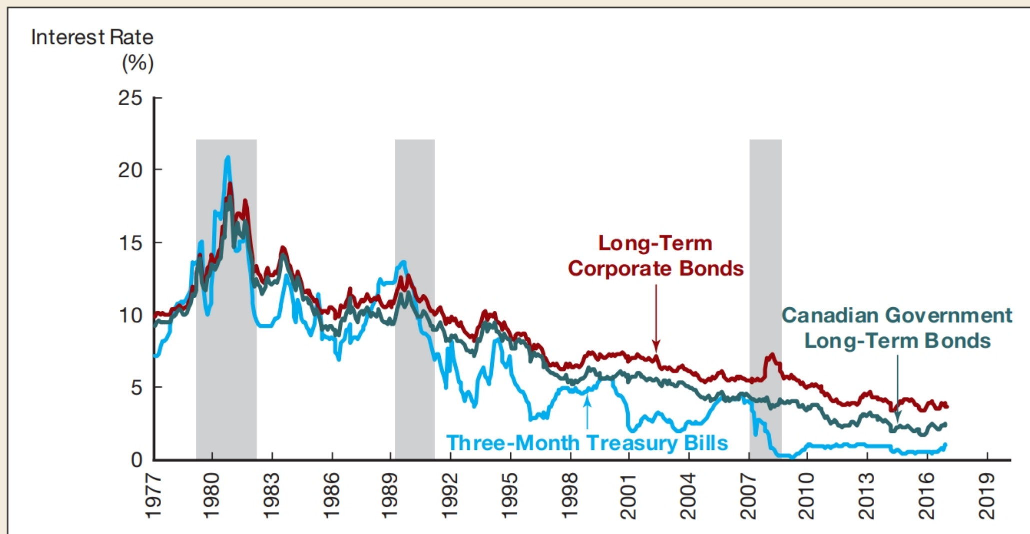

FIGURE 1-1 Interest Rates on Selected Bonds, 1977–2017

Although different interest rates have a tendency to move in unison, they often differ substantially, and the spreads between them fluctuate.

Source: Data from Statistics Canada CANSIM series V122531, V122544, and V122518, the latter extended with the 30 year A-rated corporate bond interest rate (C28730Y) from Bloomberg

corporations (shares of stock) are traded, is the most widely followed financial market in almost every country that has one; that's why it's often called simply "the market." A big swing in the prices of shares in the stock market is always a major story on the evening news. People often speculate on where the market is heading and get very excited when they can brag about their latest "big killing," but they can become depressed when they suffer a big loss. The attention the market receives can probably be best explained by one simple fact: it is a place where people can get rich—or poor—very quickly.

As Figure 1-2 indicates, stock prices are extremely volatile. After rising steadily during the 1980s, the market experienced the worst one-day drop in its entire history on October 19, 1987—"Black Monday"—with the S&P/TSX Composite Index falling by 11%. From then until 2000, the stock market experienced one of the greatest rises (often referred to as a "bull market") in its history, with the S&P/TSX climbing to a peak of over 11 000. With the collapse of the high-tech bubble in 2000, the stock market fell sharply, dropping by over 40% by late 2002. It then rose to an all-time high above the 14 000 level in early 2008, only to fall by over 50% of its value to a low of close to 8000 in early 2009. Another bull market then began, with the S&P/TSX reaching new highs of close to 16 000 by 2017. These considerable fluctuations in stock prices affect the size of people's wealth and, as a result, their willingness to spend.

The stock market is also an important factor in business investment decisions, because the price of shares affects the amount of funds that can be raised by selling newly issued stock to finance investment spending. A higher price for a firm's shares means that the firm can raise a larger amount of funds, which it can then use to buy production facilities and equipment.

In Chapter 2, we examine the role that the stock market plays in the financial system, and in Chapter 7, we return to the issue of how stock prices behave and respond to information in the marketplace.

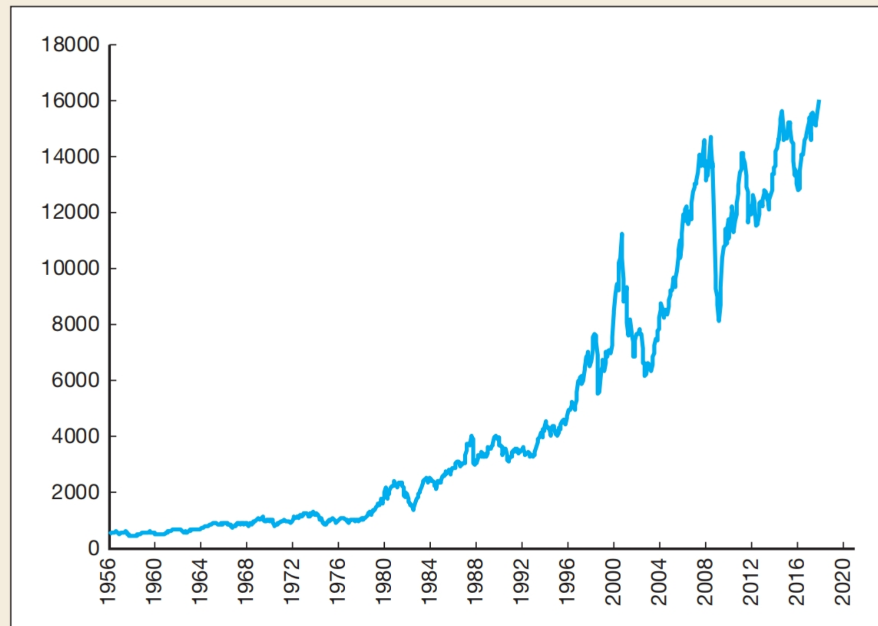

FIGURE 1-2 Stock Prices as Measured by the S&P/TSX Composite Index, 1956–2017

Stock prices are extremely volatile.

Source: Data from Statistics Canada CANSIM series V122620

WHY STUDY FINANCIAL INSTITUTIONS AND BANKING?

Part 3 of this book focuses on financial institutions and the business of banking. Banks and other financial institutions are what make financial markets work. Without them, financial markets would not be able to move funds from people who save to people who have productive investment opportunities. Thus financial institutions play a crucial role in the economy.

Structure of the Financial System

The financial system is complex, comprising many different types of private-sector financial institutions, including banks, insurance companies, mutual funds, finance companies, and investment banks, all of which are heavily regulated by the government. If an individual wanted to make a loan to Bombardier or Blackberry, for example, he or she would not go directly to the president of the company and offer a loan. Instead, he or she would lend to such a company indirectly through **financial intermediaries**, which are institutions that borrow funds from people who have saved and in turn make loans to people who need funds.

Why are financial intermediaries so crucial to well-functioning financial markets? Why do they extend credit to one party but not to another? Why do they usually write complicated legal documents when they extend loans? Why are they the most heavily regulated businesses in the economy?

We answer these questions in Chapter 8 by developing a coherent framework for analyzing financial structure in Canada and in the rest of the world.

Banks and Other Financial Institutions

Banks are financial institutions that accept deposits and make loans. The term *banks* includes firms such as chartered banks, trust and loan companies, and credit unions and *caisses populaires*. Banks are the financial intermediaries that the average person interacts with most frequently. A person who needs a loan to buy a house or a car usually obtains it from a local bank. Most Canadians keep a large portion of their financial wealth in banks in the form of chequing accounts, savings accounts, or other types of bank deposits. Because banks are the largest financial intermediaries in our economy, they deserve the most careful study. However, banks are not the only important financial institutions. Indeed, in recent years, other financial institutions, such as insurance companies, finance companies, pension funds, mutual funds, and investment banks, have been growing at the expense of banks, so we need to study them as well.

In Chapter 9, we extend the economic analysis in Chapter 8 to understand why financial regulation takes the form it does and what can go wrong in the regulatory process. In Chapter 10, we look at the banking industry and examine how the competitive environment has changed this industry. We also learn why some financial institutions have been growing at the expense of others. In Chapter 12, we examine how banks and other financial institutions manage their assets and liabilities to make profits. Because the economic environment for banks and other financial institutions has become increasingly risky, these institutions must find ways to manage risk. How financial institutions manage risk with financial derivatives is the topic of Chapter 13.

Financial Innovation

In Chapter 10, we also study **financial innovation**, the development of new financial products and services. We will see why and how financial innovation takes place, with particular emphasis on how the dramatic improvements in information technology have led to new financial products and the ability to deliver financial services electronically through what has become known as **e-finance**. We also study financial innovation because it shows us how creative thinking on the part of financial institutions can lead to higher profits but can also sometimes result in financial disasters. By studying how financial institutions have been creative in the past, we obtain a better grasp of how they may be creative in the future. This knowledge provides us with useful clues about how the financial system may change over time.

Financial Crises

At times, the financial system seizes up and produces **financial crises**, which are major disruptions in financial markets that are characterized by sharp declines in asset prices and the failures of many financial and nonfinancial firms. Financial crises have been a feature of capitalist economies for hundreds of years and are typically followed by severe business cycle downturns. Starting in August 2007, the United States economy was hit by the worst financial crisis since the Great Depression. Defaults in subprime residential mortgages led to major losses in financial institutions, producing not only numerous bank failures but also the demise of Bear Stearns and Lehman Brothers, two of the largest investment banks in the United States. The crisis produced the worst economic downturn since the Great Depression, and as a result it is now referred to as the "Great Recession."

We discuss why these crises occur and why they do so much damage to the economy in Chapter 11.

WHY STUDY MONEY AND MONETARY POLICY?

Money, also referred to as the **money supply**, is defined as anything that is generally accepted as payment for goods or services or in the repayment of debts. Money is linked to changes in economic variables that affect all of us and are important to the health of the economy. The final two parts of this book examine the role of money in the economy.

Money and Business Cycles

During 1981–1982, the total production of goods and services (called **aggregate output**) in the Canadian economy fell, and the **unemployment rate** (the percentage of the available labour force unemployed) rose to close to 12%. After 1982, the economy began to expand rapidly, and by 1989, the unemployment rate had declined to 7.5%. In 1990, the eight-year expansion came to an end, with the unemployment rate rising to above 11%. The economy bottomed out in 1991, and the subsequent recovery was the longest in Canadian history, with the unemployment rate falling to around 6% in 2008 before rising to over 8% in early 2009 in the aftermath of the global financial crisis. By 2017, the unemployment rate had fallen to close to 6%.

Why did the economy undergo such pronounced fluctuations? Evidence suggests that money plays an important role in generating **business cycles**, the upward and downward movement of aggregate output produced in the economy. Business cycles affect all of us in immediate and important ways. When output is rising, for example, it is easier to find a good job; when output is falling, finding a good job might be difficult. Figure 1-3 shows the movements of the rate of growth of the money supply over

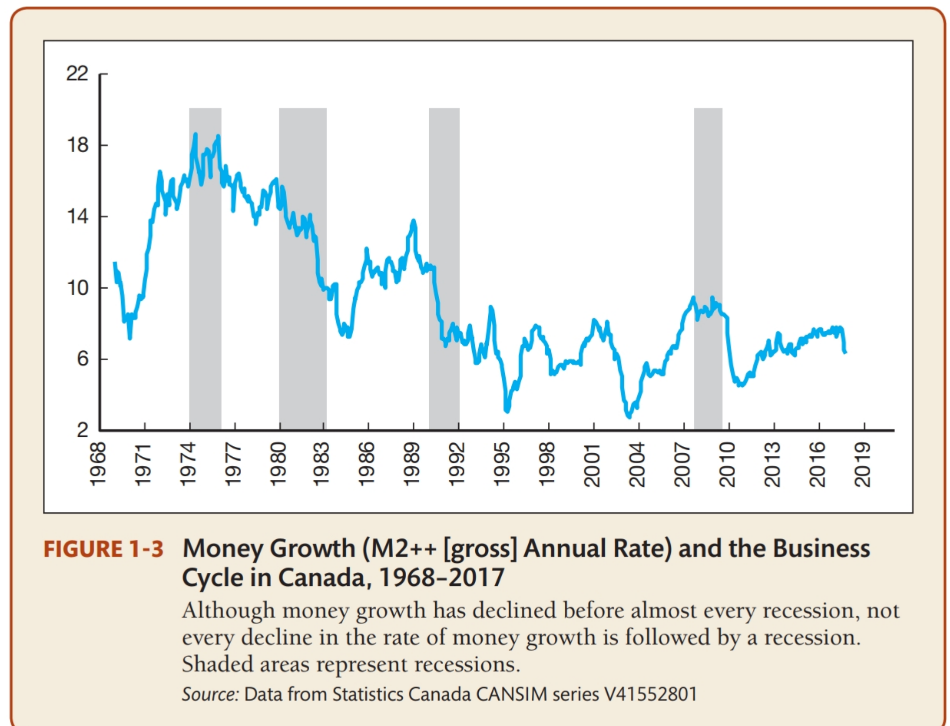

FIGURE 1-3 Money Growth (M2++ [gross] Annual Rate) and the Business Cycle in Canada, 1968–2017

Although money growth has declined before almost every recession, not every decline in the rate of money growth is followed by a recession. Shaded areas represent recessions.

Source: Data from Statistics Canada CANSIM series V41552801

the 1968–2017 period, with the shaded areas representing **recessions**, or periods of declining aggregate output. We see that the rate of money growth declined before most recessions, indicating that changes in money growth might be a driving force behind business cycle fluctuations. However, declines in the rate of money growth are often not followed by a recession.

We explore how money and monetary policy might affect aggregate output in Chapters 20 through 26 (Part 7) of this book, where we study **monetary theory**, the theory that relates the quantity of money and monetary policy to changes in aggregate economic activity and inflation.

Money and Inflation

The movie you paid $10 to see last week would have set you back only a dollar or two 30 years ago. In fact, for $10, you probably could have had dinner, seen the movie, and bought yourself a big bucket of hot buttered popcorn. As shown in Figure 1-4, which illustrates the movement of average prices in the Canadian economy from 1968 to 2017, the prices of most items are quite a bit higher now than they were then. The average price of goods and services in an economy is called the **aggregate price level** or, more simply, the *price level*. (A more precise definition is found in the appendix to this chapter.) From 1968 to 2017, the price level has increased more than sixfold. **Inflation**, a continual increase in the price level, affects individuals, businesses, and the government. It is generally regarded as an important problem to be solved and is often at the top of political and policy-making agendas. To solve the inflation problem, we need to know something about its causes.

What explains inflation? One clue to answering this question is found in Figure 1-4, which plots the money supply versus the price level. As we can see, the price level and the money supply generally rise together. These data seem to indicate that a continuing increase

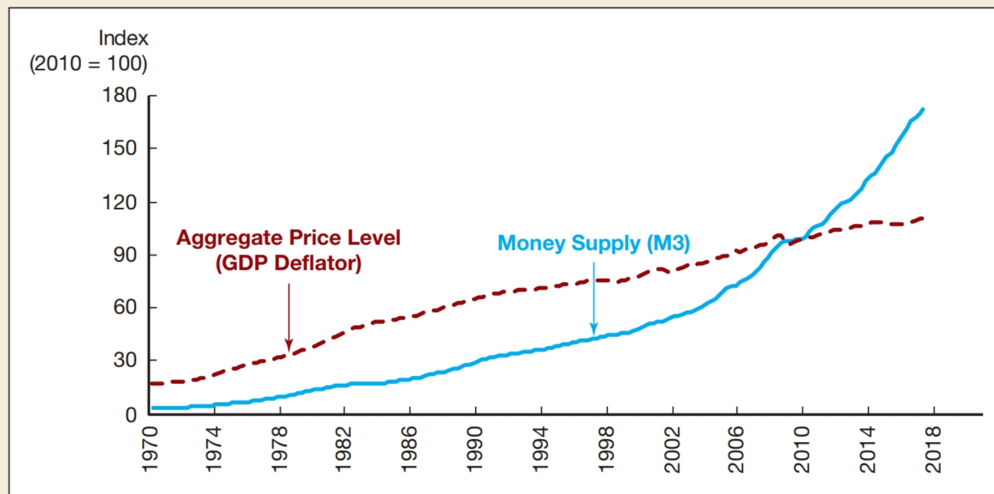

FIGURE 1-4 Aggregate Price Level and the Money Supply in Canada, 1970–2017
From 1970 to 2017, the price level increased more than sixfold.
Source: Data from Federal Reserve Bank of St. Louis, FRED database: http://research.stlouisfed.org/fred2/

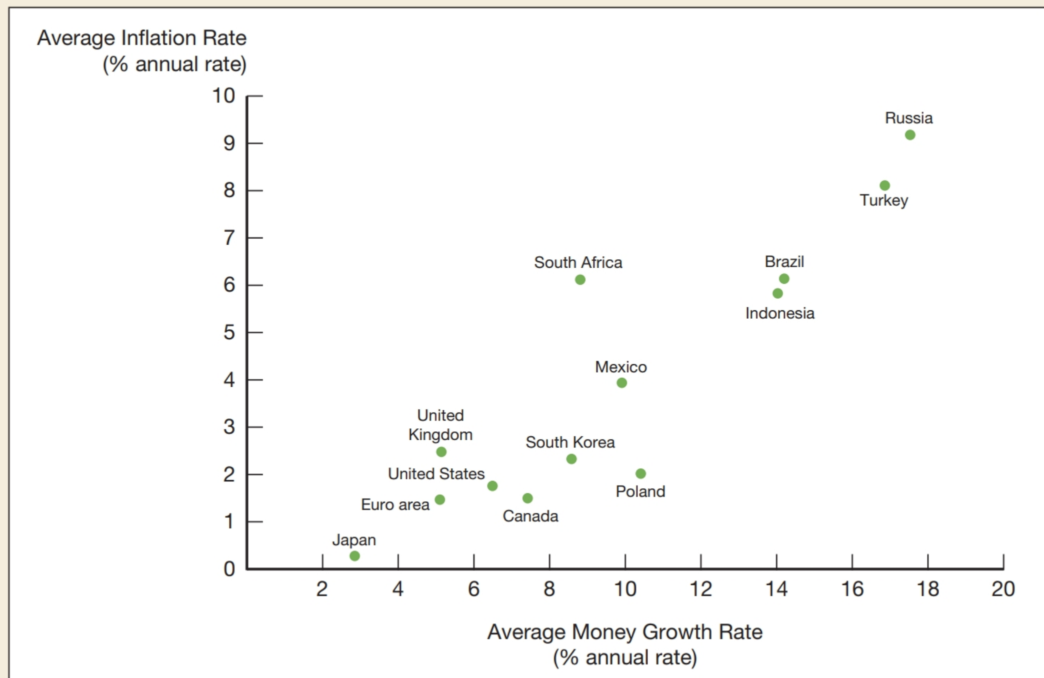

FIGURE 1-5 Average Inflation Rate Versus Average Rate of Money Growth for Selected Countries, 2006–2016

A positive association can be seen between the 10-year averages of inflation and the growth rate of the money supply: the countries with the highest inflation rates are also the ones with the highest money growth rates.

Source: Federal Reserve Bank of St. Louis, FRED database: https://fred.stlouisfed.org/

in the money supply might be an important factor in causing the continuing increase in the price level that we call inflation.

Further evidence that inflation may be tied to continuing increases in the money supply is found in Figure 1-5, which plots the average **inflation rate** (the rate of change of the price level, usually measured as a percentage change per year) for a number of countries over the 10-year period 2006–2016 against the average rate of money growth over the same period. As you can see, a positive association exists between inflation and the growth rate of the money supply: the countries with the highest inflation rates are also the ones with the highest money growth rates. Russia and Turkey, for example, experienced high inflation during this period, and their rates of money growth were high. By contrast, Japan and the eurozone experienced low inflation rates over the same period, and their rates of money growth were low. Such evidence led Milton Friedman, a Nobel laureate in economics, to make the famous statement, "Inflation is always and everywhere a monetary phenomenon."[2] We look at the quantity of money and monetary policy's role in creating inflation in Chapters 20 and 24.

[2]Milton Friedman, *Dollars and Deficits* (Upper Saddle River, NJ: Prentice Hall, 1968), p. 39.