Contents

Pr	eface		xiii
	Intro	duction	1
1		duction	1
	1.1	Dynamic General Equilibrium versus Traditional Macroeconomics	1 3
	1.2	Traditional Macroeconomics	
	1.3	Dynamic General Equilibrium Macroeconomics	4
	1.4	The Structure of This Book	10
2	The	Centralized Economy	15
	2.1	Introduction	15
	2.2	The Basic Dynamic General Equilibrium Closed Economy	15
	2.3	Golden Rule Solution	17
		2.3.1 The Steady State	17
		2.3.2 The Dynamics of the Golden Rule	20
	2.4	Optimal Solution	20
		2.4.1 Derivation of the Fundamental Euler Equation	20
		2.4.2 Interpretation of the Euler Equation	22
		2.4.3 The Intertemporal Production Possibility Frontier	23
		2.4.4 Graphical Representation of the Solution	24
		2.4.5 Static Equilibrium Solution	24
		2.4.6 Dynamics of the Optimal Solution	26
		2.4.7 Algebraic Analysis of the Saddlepath Dynamics	28
	2.5	Real-Business-Cycle Dynamics	30
		2.5.1 The Business Cycle	30
		2.5.2 Permanent Technology Shocks	31
		2.5.3 Temporary Technology Shocks	32
		2.5.4 The Stability and Dynamics of the Golden Rule Revisited	32
	2.6	Labor in the Basic Model	33
	2.7	Investment	35
		2.7.1 <i>q</i> -Theory	36
		2.7.2 Time to Build	40
	2.8	Conclusions	41
3	Econ	omic Growth	43
	3.1	Introduction	43
	3.2	Modeling Economic Growth	44

vi	Contents
----	----------

	3.3	The Sol	low-Swan Model of Growth	46
			Theory	46
		3.3.2	Growth and Economic Development	48
		3.3.3	Balanced Growth	48
	3.4	The Th	eory of Optimal Growth	49
			Theory	49
			Additional Remarks on Optimal Growth	53
	3.5		enous Growth	54
			The AK Model of Endogenous Growth	55
			Human Capital Models of Endogenous Growth	55
	3.6	Conclu		59
4	The	Decentra	alized Economy	60
		Introdu		60
	4.2	Consur	mption	61
			The Consumption Decision	61
			The Intertemporal Budget Constraint	62
			Interpreting the Euler Equation	63
			The Consumption Function	65
			Permanent and Temporary Shocks	67
	4.3	Savings		70
	4.4		cle Theory	71
			Implications of Life-Cycle Theory	71
			Model of Perpetual Youth	73
	4.5		rable and Durable Consumption	74
	4.6	Labor S		76
	4.7	Firms	mppi,	78
	1		Labor Demand without Adjustment Costs	79
			Labor Demand with Adjustment Costs	80
	4.8		l Equilibrium in a Decentralized Economy	83
	1.0		Consolidating the Household and Firm Budget Constraints	83
			The Labor Market	85
			The Goods Market	86
	4.9		rison with the Centralized Model	87
	4.10	Conclus		89
5	Corre	****************************	Expanditures and Dublic Finances	
)		Introdu	Expenditures and Public Finances	90
	5.1			90
	5.2		vernment Budget Constraint	92
			The Nominal Government Budget Constraint	92
			The Real Government Budget Constraint	94
	F 2		An Alternative Representation of the GBC	94
	5.3		ng Government Expenditures Tax Finance	95
				95
			Bond Finance	97
			Intertemporal Fiscal Policy	99
	E 4		The Ricardian Equivalence Theorem	100
	5.4		stainability of the Fiscal Stance	102
			Case 1: $[(1 + \pi)(1 + \gamma)]/(1 + R) > 1$ (Stable Case)	104
			Case 2: $0 < [(1 + \pi)(1 + \gamma)]/(1 + R) < 1$ (Unstable Case)	106
			Fiscal Rules	108
	5.5		bility and Growth Pact	109
	5.6	The Fise	cal Theory of the Price Level	111

Contents	vii

	5.7	Optimizing Public Finances	112
		5.7.1 Optimal Government Expenditures	113
		5.7.2 Optimal Tax Rates	115
		5.7.3 The Optimal Level of Debt	125
	5.8	Conclusions	127
3	Fisca	d Policy: Further Issues	129
	6.1	Introduction	129
	6.2	Time-Consistent and Time-Inconsistent Fiscal Policy	129
		6.2.1 Lump-Sum Taxation	131
		6.2.2 Taxes on Labor and Capital	134
		6.2.3 Conclusions	139
	6.3	The Overlapping-Generations Model	139
		6.3.1 Introduction	139
		6.3.2 The Basic Overlapping-Generations Model	140
		6.3.3 Short-Run Dynamics and Long-Run Equilibrium	144
		6.3.4 Comparison with the Representative-Agent Model	145
		6.3.5 Fiscal Policy in the OLG Model: Pensions	146
		6.3.6 Conclusions	151
7	The	Open Economy	153
	7.1	Introduction	153
	7.2	The Optimal Solution for the Open Economy	154
		7.2.1 The Open Economy's Resource Constraint	154
		7.2.2 The Optimal Solution	157
		7.2.3 Interpretation of the Solution	158
		7.2.4 Long-Run Equilibrium	159
		7.2.5 Shocks to the Current Account	161
	7.3	Traded and Nontraded Goods	163
	7.0	7.3.1 The Long-Run Solution	167
	7.4	The Terms of Trade and the Real Exchange Rate	168
	7.1	7.4.1 The Law of One Price	169
		7.4.2 Purchasing Power Parity	169
		7.4.3 Some Stylized Facts about the Terms of Trade and	100
		the Real Exchange Rate	170
	7.5	Imperfect Substitutability of Tradeables	172
		7.5.1 Pricing-to-Market, Local-Currency Pricing, and	
		Producer-Currency Pricing	172
		7.5.2 Imperfect Substitutability of Tradeables and Nontradeables	172
	7.6	Current-Account Sustainability	176
		7.6.1 Balance of Payments Sustainability	176
		7.6.2 The Intertemporal Approach to the Current Account	182
	7.7	Conclusions	183
3	The	Monetary Economy	185
	8.1	Introduction	185
	8.2	A Brief History of Money and Its Role	186
	8.3	The Nominal Household Budget Constraint	189
	8.4	The Cash-in-Advance Model of Money Demand	190
	8.5	Money in the Utility Function	192
	8.6	Money as an Intermediate Good or the Shopping-Time Model	195
	8.7	Transactions Costs	197
	8.8	Cash and Credit Purchases	199

iii	Contents

	8.9	Some Empirical Evidence	202
	8.10		204
	8.11		206
		8.11.1 The Friedman Rule	206
		8.11.2 The General Equilibrium Solution	207
	8.12		211
	8.13		214
	0.10		-11
9	Impe	erfectly Flexible Prices	216
	9.1	Introduction	216
	9.2	Some Stylized "Facts" about Prices and Wages	217
	9.3	Price Setting under Imperfect Competition	220
	10000	9.3.1 Theory of Pricing in Imperfect Competition	220
		9.3.2 Price Determination in the Macroeconomy with	
		Imperfect Competition	222
		9.3.3 Pricing with Intermediate Goods	226
		9.3.4 Pricing in the Open Economy: Local and	220
		Producer-Currency Pricing	229
	9.4	Price Stickiness	230
	3.4	9.4.1 Taylor Model of Overlapping Contracts	
			231
		일반 가장님이 있는 사람들이 가면 사가 있는데 가장 하면 사람들이 되었다면 보다 되었다면 보다 되었다면 보다 되었다면 보다 보다 보다면 보다 보다 보다면 보다 보다면 보다 보다 보다면 보다 보다면 보다면	233
		9.4.3 Optimal Dynamic Adjustment	234
	0 =	9.4.4 Price Level Dynamics	235
	9.5	The New Keynesian Phillips Curve	237
	0.000	9.5.1 The New Keynesian Phillips Curve in an Open Economy	240
	9.6	Conclusions	241
10	Linon	mulayment	242
10	10.1	nployment Introduction	243
			243
	10.2		244
	10.3	(1) 2 발생 [[보고 전 : 1] : [보고	246
		10.3.1 The Employment Matching Function	247
		10.3.2 Labor Demand	249
		10.3.3 Labor Supply	250
		10.3.4 Wage Bargaining	250
		10.3.5 Comment	251
	10.4	Efficiency-Wage Theory	253
		10.4.1 Comment	257
	10.5	Wage Stickiness and Unemployment	258
		10.5.1 Labor Demand	258
		10.5.2 Labor Supply	259
		10.5.3 The Equilibrium Solution	260
		10.5.4 Wage Determination	260
		10.5.5 Unemployment	261
		10.5.6 Comment	262
	10.6	Unemployment and the Effectiveness of Fiscal and Monetary Policy	263
		Conclusions	265
			_00
11	Asset	t Pricing and Macroeconomics	267
		Introduction	267
	11.2	Expected Utility and Risk	268
		11.2.1 Risk Aversion	268
		11.2.2 Risk Premium	269

Contents ix

	11.3	Insurance Premium	270
	11.4	No-Arbitrage and Market Efficiency	27
		11.4.1 Arbitrage and No-Arbitrage	27
		11.4.2 Market Efficiency	271
	11.5	Asset Pricing and Contingent Claims	272
		11.5.1 A Contingent Claim	273
		11.5.2 The Price of an Asset	273
		11.5.3 The Stochastic Discount-Factor Approach to Asset Pricing	273
		11.5.4 Asset Returns	274
		11.5.5 Risk-Free Return	274
		11.5.6 The No-Arbitrage Relation	275
		11.5.7 Risk-Neutral Valuation	275
	11.6		277
	1110	11.6.1 Using Contingent-Claims Analysis	277
		11.6.2 Asset Pricing Using the Consumption-Based	
		Capital-Asset-Pricing Model (C-CAPM)	279
	11.7		286
		11.7.1 The Capital-Asset-Pricing Model (CAPM)	289
		11.7.2 Asset Substitutability and No-Arbitrage	290
	11.8	Consumption under Uncertainty	290
	11.9		291
	11.5	11.9.1 Risk Sharing and Complete Markets	292
		11.9.2 Market Incompleteness	295
	11.10	Conclusions	296
	11.10	Conclusions	290
2	Finan	ncial Markets	298
-		Introduction	298
	12.2	The Stock Market	299
	16.6	12.2.1 The Present-Value Model	299
		12.2.2 The General Equilibrium Model of Stock Prices	303
		12.2.3 Comment	306
	12.3	The Bond Market	306
	12.3	12.3.1 The Term Structure of Interest Rates	307
		12.3.2 The Term Premium	312
		12.3.3 Macroeconomic Sources of Risk in the Term Structure	318
		12.3.4 Estimating Future Inflation from the Yield Curve	321
		12.3.5 Comment	322
		12.3.6 Monetary Policy and the Term Structure	323
		12.3.7 Comment	327
	10.4	12.3.8 DSGE Models of the Term Structure	327
	12.4	The FOREX Market	331
		12.4.1 Uncovered and Covered Interest Parity	333
		12.4.2 The General Equilibrium Model of FOREX	342
	10 =	12.4.3 Comment	345
	12.5	Conclusions	346
3	Nomi	inal Exchange Rates	348
٠		Introduction	348
	13.1	International Monetary Arrangements 1873–2011	350
	10.4	13.2.1 The Gold Standard System: 1873–1937	351
		13.2.2 The Bretton Woods System: 1945–71	352
		13.2.3 Floating Exchange Rates: 1973–2011	353
		13.2.3 Hodding Lachdinge Nates, 13/3-2011	000

	Contents

X

	13.3		eynesian IS-LM-BP Model of the Exchange Rate The IS-LM Model	357 358
				362
			The BP Equation	302
		13.3.3	Fixed Exchange Rates: The Monetary Approach to the Balance of Payments	365
		13.3.4	Exchange-Rate Determination with Imperfect Capital	
			Substitutability	366
	13.4	UIP an	d Exchange-Rate Determination	368
	13.5		undell-Fleming Model of the Exchange Rate	370
			Theory	370
			Monetary Policy	371
			Fiscal Policy	372
	13.6		onetary Model of the Exchange Rate	373
			Theory	373
			Monetary Policy	375
			Fiscal Policy	378
	13.7		ornbusch Model of the Exchange Rate	378
			Theory	378
			Monetary Policy	381
			Fiscal Policy	383
			Comparison of the Dornbusch and Monetary Models	385
	13.8		onetary Model with Sticky Prices	386
	13.9		ostfeld-Rogoff Redux Model	387
			The Basic Redux Model with Flexible Prices	389
			Log-Linear Approximation	394
		13.9.3	The Small-Economy Version of the Redux Model	396
		1201	with Sticky Prices	399
	10.10		Comment	399
	13.10) Conclu	ISIONS	399
14	Mone	etary Po	olicy	402
		Introd		402
			on and the Fisher Equation	407
			eynesian Model of Inflation	409
	11.0		Theory	409
			Empirical Evidence	412
	14.4		ew Keynesian Model of Inflation	413
			Theory	413
			The Effectiveness of Inflation Targeting in the	
			New Keynesian Model	419
		14.4.3	Inflation Targeting with a Flexible Exchange Rate	426
			The Nominal Exchange Rate Under Inflation Targeting	430
			Inflation Targeting and Supply Shocks	432
	14.5		al Inflation Targeting	434
			Social Welfare and the Inflation Objective Function	434
			Optimal Inflation Policy under Discretion	437
			Optimal Inflation Policy under Commitment to a Rule	441
			Intertemporal Optimization and Time-Consistent	
		amora 1,750-50 (\$10	Inflation Targeting	442
		14.5.5	Central Bank Preferences versus Public Preferences	445
	14.6		al Monetary Policy Using the New Keynesian Model	446
			Using Discretion	446
			Rules-Based Policy	448

Contents xi

	14.7		450
	14.8	Monetary Policy in the Eurozone	455
		14.8.1 A New Keynesian Model of the Eurozone	457
		14.8.2 Optimal Eurozone Monetary Policy	458
		14.8.3 Individual Country Inflation	459
		14.8.4 Eurozone Country Inflation Differentials	459
		14.8.5 Is There Another Solution?	460
	14.9	Conclusions	461
15	Bank	s, Financial Intermediation, and Unconventional Monetary Policy	464
	15.1		464
	15.2	Some Lessons from the Financial Crisis	465
	15.3	Financial Market Imperfections	467
		15.3.1 Borrowing Constraints	467
		15.3.2 Default	469
		15.3.3 Imperfect Information	471
	15.4	Modern Banking: A Brief History and Its Role in the Financial Crisis	474
			478
	15.6	The Theory of Bank Runs	478
		15.6.1 Households and the Banks	479
		15.6.2 The Interbank Market	481
		15.6.3 Central Bank Intervention	483
		15.6.4 Comment	485
	15.7	A Theory of Unconventional Monetary Policy	487
		15.7.1 Households	488
		15.7.2 Financial Intermediaries	489
		15.7.3 The Central Bank	489
		15.7.4 Comment	490
	15.8	A DSGE Model with Default	491
		15.8.1 The Nonbank Private Sector	492
		15.8.2 Banks	494
		15.8.3 Government	496
		15.8.4 Comment	497
	15.9	Conclusions	499
16	Real	Business Cycles, DSGE Models, and Economic Fluctuations	501
		Introduction	501
	16.2	The Methodology of RBC Analysis	502
		16.2.1 The Steady-State Solution	505
		16.2.2 Short-Run Dynamics	506
		Empirical Methods	508
	16.4	Empirical Evidence on the RBC Model	511
		16.4.1 The Basic RBC Model	512
		16.4.2 Extensions to the Basic RBC Model	514
	18 6	16.4.3 The Open-Economy RBC Model	516
	16.5	DSGE Models of the Monetary Economy	521
		16.5.1 The Smets-Wouters Model	522
	100	16.5.2 Empirical Results	526
	16.6	Wedges, Frictions, and Economic Fluctuations	528
		16.6.1 A Benchmark Model	528
		16.6.2 Alternative Explanations of the Wedges	529
		16.6.3 Frictions	531
		16.6.4 Comment	533

xii	Contents

	16.7	The Identification of a New Keynesian Model	533
	16.8	Some Reflections on the Choices Involved in Constructing a	
		DSGE Model	534
	16.9	Conclusions	536
17	Math	ematical Appendix	538
	17.1	Introduction	538
	17.2	Dynamic Optimization	538
	17.3	The Method of Lagrange Multipliers	540
		17.3.1 Equality Constraints	540
		17.3.2 Inequality Constraints	545
	17.4	Continuous-Time Optimization	546
		17.4.1 The Calculus of Variations	547
		17.4.2 The Maximum Principle	548
	17.5	Dynamic Programming	548
	17.6	Stochastic Dynamic Optimization	552
	17.7	Time Consistency and Time Inconsistency	554
	17.8	The Linear Rational-Expectations Models	556
		17.8.1 Rational Expectations	557
		17.8.2 The First-Order Nonstochastic Equation	558
		17.8.3 Whiteman's Solution Method for Linear	
		Rational-Expectations Models	560
		17.8.4 Systems of Rational-Expectations Equations	567
References			575
no	lex		589