

Contents

Business Snapshots	xvii
Preface	xix
CHAPTER 1	
Introduction	1
1.1 Risk vs. Return for Investors	2
1.2 The Efficient Frontier	5
1.3 The Capital Asset Pricing Model	8
1.4 Arbitrage Pricing Theory	13
1.5 Risk vs. Return for Companies	13
1.6 Risk Management by Financial Institutions	16
1.7 Credit Ratings	18
Summary	18
Further Reading	19
Practice Questions and Problems	19
Further Questions	20
CHAPTER 2	
Banks	21
2.1 Commercial Banking	22
2.2 The Capital Requirements of a Small Commercial Bank	24
2.3 Deposit Insurance	26
2.4 Investment Banking	27
2.5 Securities Trading	32
2.6 Potential Conflicts of Interest in Banking	33
2.7 Today's Large Banks	34
2.8 The Risks Facing Banks	37
Summary	38
Further Reading	38
Practice Questions and Problems	38
Further Questions	39
CHAPTER 3	
Insurance Companies and Pension Plans	41
3.1 Life Insurance	41
3.2 Annuity Contracts	45
3.3 Mortality Tables	46
3.4 Longevity and Mortality Risk	50
3.5 Property-Casualty Insurance	51
	vii

3.6	Health Insurance	53
3.7	Moral Hazard and Adverse Selection	55
3.8	Reinsurance	56
3.9	Capital Requirements	56
3.10	The Risks Facing Insurance Companies	58
3.11	Regulation	58
3.12	Pension Plans	59
	Summary	62
	Further Reading	64
	Practice Questions and Problems	64
	Further Questions	65
CHAPTER 4		
Mutual Funds and Hedge Funds		67
4.1	Mutual Funds	67
4.2	Hedge Funds	74
4.3	Hedge Fund Strategies	79
4.4	Hedge Fund Performance	83
	Summary	84
	Further Reading	85
	Practice Questions and Problems	85
	Further Questions	86
CHAPTER 5		
Trading in Financial Markets		89
5.1	The Markets	89
5.2	Long and Short Positions in Assets	90
5.3	Derivatives Markets	92
5.4	Plain Vanilla Derivatives	93
5.5	Clearing Houses	103
5.6	Margin	104
5.7	Non-Traditional Derivatives	107
5.8	Exotic Options and Structured Products	111
5.9	Risk Management Challenges	114
	Summary	115
	Further Reading	115
	Practice Questions and Problems	116
	Further Questions	118
CHAPTER 6		
The Credit Crisis of 2007		121
6.1	The U.S. Housing Market	121
6.2	Securitization	124
6.3	The Crisis	131
6.4	What Went Wrong?	131
6.5	Lessons from the Crisis	133
	Summary	134
	Further Reading	135

Practice Questions and Problems	136
Further Questions	136
CHAPTER 7	
How Traders Manage Their Risks	137
7.1 Delta	137
7.2 Gamma	144
7.3 Vega	146
7.4 Theta	148
7.5 Rho	149
7.6 Calculating Greek Letters	150
7.7 Taylor Series Expansions	151
7.8 The Realities of Hedging	152
7.9 Hedging Exotic Options	153
7.10 Scenario Analysis	154
Summary	156
Further Reading	156
Practice Questions and Problems	156
Further Questions	157
CHAPTER 8	
Interest Rate Risk	159
8.1 The Management of Net Interest Income	159
8.2 LIBOR and Swap Rates	162
8.3 Duration	164
8.4 Convexity	168
8.5 Generalization	169
8.6 Nonparallel Yield Curve Shifts	172
8.7 Interest Rate Deltas in Practice	174
8.8 Principal Components Analysis	176
8.9 Gamma and Vega	179
Summary	179
Further Reading	180
Practice Questions and Problems	181
Further Questions	181
CHAPTER 9	
Value at Risk	183
9.1 Definition of VaR	183
9.2 Examples of the Calculation of VaR	185
9.3 VaR vs. Expected Shortfall	186
9.4 VaR and Capital	188
9.5 Coherent Risk Measures	190
9.6 Choice of Parameters for VaR	191
9.7 Marginal VaR, Incremental VaR, and Component VaR	195
9.8 Euler's Theorem	196
9.9 Aggregating VaRs	197
9.10 Back-Testing	197

Summary	200
Further Reading	201
Practice Questions and Problems	201
Further Questions	202
CHAPTER 10	
Volatility	205
10.1 Definition of Volatility	205
10.2 Implied Volatilities	208
10.3 Are Daily Percentage Changes in Financial Variables Normal?	209
10.4 The Power Law	211
10.5 Monitoring Daily Volatility	213
10.6 The Exponentially Weighted Moving Average Model	216
10.7 The GARCH(1,1) Model	218
10.8 Choosing Between the Models	220
10.9 Maximum Likelihood Methods	220
10.10 Using GARCH(1,1) to Forecast Future Volatility	225
Summary	229
Further Reading	229
Practice Questions and Problems	230
Further Questions	231
CHAPTER 11	
Correlations and Copulas	233
11.1 Definition of Correlation	233
11.2 Monitoring Correlation	235
11.3 Multivariate Normal Distributions	238
11.4 Copulas	240
11.5 Application to Loan Portfolios: Vasicek's Model	246
Summary	252
Further Reading	253
Practice Questions and Problems	253
Further Questions	254
CHAPTER 12	
Basel I, Basel II, and Solvency II	257
12.1 The Reasons for Regulating Banks	257
12.2 Bank Regulation Pre-1988	258
12.3 The 1988 BIS Accord	259
12.4 The G-30 Policy Recommendations	262
12.5 Netting	263
12.6 The 1996 Amendment	265
12.7 Basel II	268
12.8 Credit Risk Capital Under Basel II	269
12.9 Operational Risk Capital Under Basel II	277
12.10 Pillar 2: Supervisory Review	278
12.11 Pillar 3: Market Discipline	278

12.12	Solvency II	279
	Summary	280
	Further Reading	281
	Practice Questions and Problems	281
	Further Questions	283
CHAPTER 13		
Basel 2.5, Basel III, and Dodd–Frank		285
13.1	Basel 2.5	285
13.2	Basel III	289
13.3	Contingent Convertible Bonds	295
13.4	Dodd–Frank Act	296
13.5	Legislation in Other Countries	298
	Summary	299
	Further Reading	300
	Practice Questions and Problems	300
	Further Questions	301
CHAPTER 14		
Market Risk VaR: The Historical Simulation Approach		303
14.1	The Methodology	303
14.2	Accuracy	308
14.3	Extensions	309
14.4	Computational Issues	313
14.5	Extreme Value Theory	314
14.6	Applications of EVT	317
	Summary	319
	Further Reading	320
	Practice Questions and Problems	320
	Further Questions	321
CHAPTER 15		
Market Risk VaR: The Model-Building Approach		323
15.1	The Basic Methodology	323
15.2	Generalization	326
15.3	Correlation and Covariance Matrices	327
15.4	Handling Interest Rates	330
15.5	Applications of the Linear Model	334
15.6	Linear Model and Options	335
15.7	Quadratic Model	338
15.8	Monte Carlo Simulation	340
15.9	Non-Normal Assumptions	341
15.10	Model-Building vs. Historical Simulation	342
	Summary	343
	Further Reading	343
	Practice Questions and Problems	343
	Further Questions	345

CHAPTER 16

Credit Risk: Estimating Default Probabilities	347
16.1 Credit Ratings	347
16.2 Historical Default Probabilities	349
16.3 Recovery Rates	351
16.4 Credit Default Swaps	352
16.5 Credit Spreads	357
16.6 Estimating Default Probabilities from Credit Spreads	360
16.7 Comparison of Default Probability Estimates	362
16.8 Using Equity Prices to Estimate Default Probabilities	367
Summary	370
Further Reading	371
Practice Questions and Problems	371
Further Questions	373

CHAPTER 17

Counterparty Credit Risk in Derivatives	375
17.1 Credit Exposure on Derivatives	375
17.2 Bilateral Clearing	376
17.3 Central Clearing	380
17.4 CVA	382
17.5 The Impact of a New Transaction	385
17.6 CVA Risk	387
17.7 Wrong Way Risk	388
17.8 DVA	389
17.9 Some Simple Examples	389
Summary	394
Further Reading	395
Practice Questions and Problems	395
Further Questions	396

CHAPTER 18

Credit Value at Risk	399
18.1 Ratings Transition Matrices	400
18.2 Vasicek's Model	402
18.3 Credit Risk Plus	403
18.4 CreditMetrics	405
18.5 Credit VaR in the Trading Book	406
Summary	410
Further Reading	410
Practice Questions and Problems	411
Further Questions	411

CHAPTER 19

Scenario Analysis and Stress Testing	413
19.1 Generating the Scenarios	413
19.2 Regulation	419

19.3	What to Do with the Results	423
	Summary	426
	Further Reading	426
	Practice Questions and Problems	427
	Further Questions	428
CHAPTER 20		
Operational Risk		429
20.1	What is Operational Risk?	430
20.2	Determination of Regulatory Capital	431
20.3	Categorization of Operational Risks	433
20.4	Loss Severity and Loss Frequency	434
20.5	Implementation of AMA	435
20.6	Proactive Approaches	439
20.7	Allocation of Operational Risk Capital	440
20.8	Use of Power Law	441
20.9	Insurance	442
20.10	Sarbanes-Oxley	443
	Summary	444
	Further Reading	445
	Practice Questions and Problems	445
	Further Questions	446
CHAPTER 21		
Liquidity Risk		447
21.1	Liquidity Trading Risk	447
21.2	Liquidity Funding Risk	454
21.3	Liquidity Black Holes	462
	Summary	468
	Further Reading	469
	Practice Questions and Problems	470
	Further Questions	470
CHAPTER 22		
Model Risk		473
22.1	Marking to Market	473
22.2	Models for Linear Products	475
22.3	Physics vs. Finance	476
22.4	How Models are Used for Pricing Standard Products	478
22.5	Hedging	484
22.6	Models for Nonstandard Products	485
22.7	Dangers in Model Building	486
22.8	Detecting Model Problems	487
	Summary	488
	Further Reading	488
	Practice Questions and Problems	489
	Further Questions	489

CHAPTER 23

Economic Capital and RAROC	491
23.1 Definition of Economic Capital	491
23.2 Components of Economic Capital	493
23.3 Shapes of the Loss Distributions	495
23.4 Relative Importance of Risks	497
23.5 Aggregating Economic Capital	498
23.6 Allocation of Economic Capital	501
23.7 Deutsche Bank's Economic Capital	503
23.8 RAROC	503
Summary	505
Further Reading	506
Practice Questions and Problems	506
Further Questions	507

CHAPTER 24

Risk Management Mistakes to Avoid	509
24.1 Risk Limits	509
24.2 Managing the Trading Room	512
24.3 Liquidity Risk	514
24.4 Lessons for Nonfinancial Corporations	517
24.5 A Final Point	518
Further Reading	519

Appendix A

Compounding Frequencies for Interest Rates	521
---	------------

Appendix B

Zero Rates, Forward Rates, and Zero-Coupon Yield Curves	525
--	------------

Appendix C

Valuing Forward and Futures Contracts	529
--	------------

Appendix D

Valuing Swaps	531
----------------------	------------

Appendix E

Valuing European Options	533
---------------------------------	------------

Appendix F

Valuing American Options	535
---------------------------------	------------

Appendix G

Taylor Series Expansions	539
---------------------------------	------------

Appendix H

Eigenvectors and Eigenvalues	543
-------------------------------------	------------

Contents

XV

Appendix I	
Principal Components Analysis	547
Appendix J	
Manipulation of Credit Transition Matrices	549
Appendix K	
Valuation of Credit Default Swaps	551
Appendix L	
Synthetic CDOs and Their Valuation	555
Answers to Questions and Problems	559
Glossary	595
DerivaGem Software	615
Table for $N(x)$ when $x \leq 0$	621
Table for $N(x)$ when $x \geq 0$	623
Index	625

<http://www.pbookshop.com>

<http://www.pbookshop.com>