

# Contents

<b>Foreword</b>	<b>xvii</b>
<b>Preface</b>	<b>xix</b>
<b>Acknowledgments</b>	<b>xxiii</b>
<b>About the Author</b>	<b>xxvii</b>
<b>CHAPTER 1</b>	
<b>Introduction</b>	<b>1</b>
1.1 Lessons from a Crisis	1
1.2 Financial Risk and Actuarial Risk	2
1.3 Simulation and Subjective Judgment	4
<b>CHAPTER 2</b>	
<b>Institutional Background</b>	<b>7</b>
2.1 Moral Hazard—Insiders and Outsiders	7
2.2 Ponzi Schemes	17
2.3 Adverse Selection	19
2.4 The Winner’s Curse	21
2.5 Market Making versus Position Taking	24
<b>CHAPTER 3</b>	
<b>Operational Risk</b>	<b>29</b>
3.1 Operations Risk	31
3.1.1 The Risk of Fraud	31
3.1.2 The Risk of Nondeliberate Incorrect Information	35
3.1.3 Disaster Risk	36
3.1.4 Personnel Risk	36
3.2 Legal Risk	37
3.2.1 The Risk of Unenforceable Contracts	37
3.2.2 The Risk of Illegal Actions	40
3.3 Reputational Risk	41
3.4 Accounting Risk	42

3.5	Funding Liquidity Risk	42
3.6	Enterprise Risk	44
3.7	Identification of Risks	44
3.8	Operational Risk Capital	45
<b>CHAPTER 4</b>		
	<b>Financial Disasters</b>	<b>49</b>
4.1	Disasters Due to Misleading Reporting	49
4.1.1	Chase Manhattan Bank/Drysdale Securities	52
4.1.2	Kidder Peabody	53
4.1.3	Barings Bank	55
4.1.4	Allied Irish Bank (AIB)	57
4.1.5	Union Bank of Switzerland (UBS)	59
4.1.6	Société Générale	61
4.1.7	Other Cases	66
4.2	Disasters Due to Large Market Moves	68
4.2.1	Long-Term Capital Management (LTCM)	68
4.2.2	Metallgesellschaft (MG)	75
4.3	Disasters Due to the Conduct of Customer Business	77
4.3.1	Bankers Trust (BT)	77
4.3.2	JPMorgan, Citigroup, and Enron	79
4.3.3	Other Cases	80
<b>CHAPTER 5</b>		
	<b>The Systemic Disaster of 2007–2008</b>	<b>83</b>
5.1	Overview	83
5.2	The Crisis in CDOs of Subprime Mortgages	85
5.2.1	Subprime Mortgage Originators	86
5.2.2	CDO Creators	88
5.2.3	Rating Agencies	89
5.2.4	Investors	92
5.2.5	Investment Banks	93
5.2.6	Insurers	106
5.3	The Spread of the Crisis	108
5.3.1	Credit Contagion	108
5.3.2	Market Contagion	109
5.4	Lessons from the Crisis for Risk Managers	111
5.4.1	Subprime Mortgage Originators	111
5.4.2	CDO Creators	111
5.4.3	Rating Agencies	111
5.4.4	Investors	111
5.4.5	Investment Banks	112

5.4.6	Insurers	114
5.4.7	Credit Contagion	115
5.4.8	Market Contagion	115
5.5	Lessons from the Crisis for Regulators	115
5.5.1	Mortgage Originators	116
5.5.2	CDO Creators	116
5.5.3	Rating Agencies	117
5.5.4	Investors	118
5.5.5	Investment Banks	118
5.5.6	Insurers	126
5.5.7	Credit Contagion	126
5.5.8	Market Contagion	129
5.6	Broader Lessons from the Crisis	132
<b>CHAPTER 6</b>		
<b>Managing Financial Risk</b>		<b>133</b>
6.1	Risk Measurement	133
6.1.1	General Principles	133
6.1.2	Risk Management of Instruments That Lack Liquidity	144
6.1.3	Market Valuation	147
6.1.4	Valuation Reserves	152
6.1.5	Analysis of Revenue	156
6.1.6	Exposure to Changes in Market Prices	157
6.1.7	Risk Measurement for Position Taking	159
6.2	Risk Control	161
<b>CHAPTER 7</b>		
<b>VaR and Stress Testing</b>		<b>169</b>
7.1	VaR Methodology	170
7.1.1	Simulation of the P&L Distribution	173
7.1.2	Measures of the P&L Distribution	187
7.2	Stress Testing	192
7.2.1	Overview	192
7.2.2	Economic Scenario Stress Tests	193
7.2.3	Stress Tests Relying on Historical Data	197
7.3	Uses of Overall Measures of Firm Position Risk	201
<b>CHAPTER 8</b>		
<b>Model Risk</b>		<b>209</b>
8.1	How Important Is Model Risk?	210
8.2	Model Risk Evaluation and Control	212

8.2.1	Scope of Model Review and Control	213
8.2.2	Roles and Responsibilities for Model Review and Control	214
8.2.3	Model Verification	219
8.2.4	Model Verification of Deal Representation	222
8.2.5	Model Verification of Approximations	223
8.2.6	Model Validation	226
8.2.7	Continuous Review	232
8.2.8	Periodic Review	234
8.3	Liquid Instruments	237
8.4	Illiquid Instruments	241
8.4.1	Choice of Model Validation Approach	241
8.4.2	Choice of Liquid Proxy	243
8.4.3	Design of Monte Carlo Simulation	245
8.4.4	Implications for Marking to Market	247
8.4.5	Implications for Risk Reporting	249
8.5	Trading Models	250
<b>CHAPTER 9</b>		
	<b>Managing Spot Risk</b>	<b>253</b>
9.1	Overview	253
9.2	Foreign Exchange Spot Risk	257
9.3	Equity Spot Risk	258
9.4	Physical Commodities Spot Risk	259
<b>CHAPTER 10</b>		
	<b>Managing Forward Risk</b>	<b>263</b>
10.1	Instruments	270
10.1.1	Direct Borrowing and Lending	270
10.1.2	Repurchase Agreements	271
10.1.3	Forwards	272
10.1.4	Futures Contracts	272
10.1.5	Forward Rate Agreements	274
10.1.6	Interest Rate Swaps	275
10.1.7	Total Return Swaps	276
10.1.8	Asset-Backed Securities	278
10.2	Mathematical Models of Forward Risks	282
10.2.1	Pricing Illiquid Flows by Interpolation	284
10.2.2	Pricing Long-Dated Illiquid Flows by Stack and Roll	291
10.2.3	Flows Representing Promised Deliveries	293
10.2.4	Indexed Flows	295

10.3	Factors Impacting Borrowing Costs	299
10.3.1	The Nature of Borrowing Demand	299
10.3.2	The Possibility of Cash-and-Carry Arbitrage	300
10.3.3	The Variability of Storage Costs	301
10.3.4	The Seasonality of Borrowing Costs	302
10.3.5	Borrowing Costs and Forward Prices	303
10.4	Risk Management Reporting and Limits for Forward Risk	304
<b>CHAPTER 11</b>		
	<b>Managing Vanilla Options Risk</b>	<b>311</b>
11.1	Overview of Options Risk Management	313
11.2	The Path Dependence of Dynamic Hedging	318
11.3	A Simulation of Dynamic Hedging	321
11.4	Risk Reporting and Limits	329
11.5	Delta Hedging	344
11.6	Building a Volatility Surface	346
11.6.1	Interpolating between Time Periods	346
11.6.2	Interpolating between Strikes—Smile and Skew	347
11.6.3	Extrapolating Based on Time Period	352
11.7	Summary	355
<b>CHAPTER 12</b>		
	<b>Managing Exotic Options Risk</b>	<b>359</b>
12.1	Single-Payout Options	364
12.1.1	Log Contracts and Variance Swaps	367
12.1.2	Single-Asset Quanto Options	369
12.1.3	Convexity	370
12.1.4	Binary Options	371
12.1.5	Contingent Premium Options	377
12.1.6	Accrual Swaps	378
12.2	Time-Dependent Options	378
12.2.1	Forward-Starting and Cliquet Options	378
12.2.2	Compound Options	379
12.3	Path-Dependent Options	381
12.3.1	Standard Analytic Models for Barriers	383
12.3.2	Dynamic Hedging Models for Barriers	385
12.3.3	Static Hedging Models for Barriers	387
12.3.4	Barrier Options with Rebates, Lookback, and Ladder Options	402
12.3.5	Broader Classes of Path-Dependent Exotics	403
12.4	Correlation-Dependent Options	404

12.4.1	Linear Combinations of Asset Prices	405
12.4.2	Risk Management of Options on Linear Combinations	409
12.4.3	Index Options	413
12.4.4	Options to Exchange One Asset for Another	415
12.4.5	Nonlinear Combinations of Asset Prices	417
12.4.6	Correlation between Price and Exercise	422
12.5	Correlation-Dependent Interest Rate Options	425
12.5.1	Models in Which the Relationship between Forwards Is Treated as Constant	426
12.5.2	Term Structure Models	430
12.5.3	Relationship between Swaption and Cap Prices	437
<b>CHAPTER 13</b>		
	<b>Credit Risk</b>	<b>445</b>
13.1	Short-Term Exposure to Changes in Market Prices	446
13.1.1	Credit Instruments	447
13.1.2	Models of Short-Term Credit Exposure	451
13.1.3	Risk Reporting for Market Credit Exposures	456
13.2	Modeling Single-Name Credit Risk	457
13.2.1	Estimating Probability of Default	458
13.2.2	Estimating Loss Given Default	465
13.2.3	Estimating the Amount Owed at Default	468
13.2.4	The Option-Theoretic Approach	471
13.3	Portfolio Credit Risk	479
13.3.1	Estimating Default Correlations	479
13.3.2	Monte Carlo Simulation of Portfolio Credit Risk	482
13.3.3	Computational Alternatives to Full Simulation	486
13.3.4	Risk Management and Reporting for Portfolio Credit Exposures	490
13.4	Risk Management of Multiname Credit Derivatives	493
13.4.1	Multiname Credit Derivatives	493
13.4.2	Modeling of Multiname Credit Derivatives	495
13.4.3	Risk Management and Reporting for Multiname Credit Derivatives	498
13.4.4	CDO Tranches and Systematic Risk	500
<b>CHAPTER 14</b>		
	<b>Counterparty Credit Risk</b>	<b>505</b>
14.1	Overview	505
14.2	Exchange-Traded Derivatives	506

---

14.3	Over-the-Counter Derivatives	512
14.3.1	Overview	512
14.3.2	The Loan-Equivalent Approach	513
14.3.3	The Collateralization Approach	515
14.3.4	The Collateralization Approach— Wrong-Way Risk	521
14.3.5	The Active Management Approach	526
<b>References</b>		<b>533</b>
<b>About the Companion Website</b>		<b>547</b>
<b>Index</b>		<b>553</b>

<http://www.pbookshop.com>

<http://www.pbookshop.com>