PART ONE

VaR MEASUREMENT

Chapter 1

Calculating VaR for Hedge Funds  3

Monica Billio, Mila Getmansky, and Loriana Pelizzon

Introduction  4
Hedge Funds  5
Value at Risk  6
Data  13
Results and Discussion  14
Conclusion  20
References  20
Appendix: Strategic Decisions  22

Chapter 2

Efficient VaR: Using Past Forecast Performance to Generate Improved VaR Forecasts  25

Kevin Dowd and Carlos Blanco

Introduction  25
A Backtesting Framework  27
Using Backtest Results to Recalibrate the Parameters of the VaR Model  29
Some Examples  31
Conclusion  36
References  37
Appendix  38
## Chapter 3

**Applying VaR to Hedge Fund Trading Strategies: Limitations and Challenges**  
*R. McFall Lamm, Jr.*

- Introduction 41
- Background 43
- Analytical Approach 44
- Application Considerations 46
- Impact of VaR Control 47
- Short versus Long History for Setting VaR Risk Limits 51
- Implications 53
- Conclusion 55
- References 56

## Chapter 4

**Cash Flow at Risk: Linking Strategy and Finance**  
*Ulrich Hommel*

- Introduction 59
- A Process View of the Corporate Risk Management Function 62
- Value-Based Motives of Firm-Level Risk Management 66
- The Incompatibility of Simple Value at Risk with Corporate Risk Management 70
- Operationalizing CFaR 72
- Governance Implications 78
- Conclusion 80
- References 81

## Chapter 5

**Plausible Operational Value-at-Risk Calculations for Management Decision Making**  
*Wilhelm Kross, Ulrich Hommel, and Martin Wiethuechter*

- Introduction 85
- Operational Risk under Basel II 86
- Desirable Side Effects of Operational Risk Initiatives 91
- Toward Strategy-Enhancing Operational Risk Initiatives 95
- Employment of Real Option Techniques in Operational Risk Initiatives 99
## Chapter 6

**Value-at-Risk Performance Criterion: A Performance Measure for Evaluating Value-at-Risk Models**  
*Zeno Adams and Roland Füss*

**Introduction** 106

*Value-at-Risk* Performance Criterion (VPC) 107

Effects of Changing Volatility and Return Distribution 109

**Conclusion** 115

**References** 119

---

## Chapter 7

**Explaining Cross-Sectional Differences in Credit Default Swap Spreads: An Alternative Approach Using Value at Risk**  
*Bastian Breitenfellner and Niklas Wagner*

**Introduction** 122

Estimation Methodology 126

Data and Explanatory Variables 128

Empirical Results 131

**Conclusion** 135

**References** 135

---

## Chapter 8

**Some Advanced Approaches to VaR Calculation and Measurement**  
*François-Éric Racicot and Raymond Théoret*

**Introduction** 139

Parametric VaR and the Normal Distribution 141

Using Historical Simulation to Compute VaR 142

The Delta Method for Computing VaR 145

The Monte Carlo Simulation 147

The Bootstrapping Method 149

Cornish-Fisher Expansion and VaR 155
Value at Risk for a Distribution Other Than the Normal but Using a Normal Coefficient 156
Copulas, Fourier’s Transform, and the VaR 157
Conclusion 162
References 163

Chapter 9

Computational Aspects of Value at Risk 167
Germán Navarro and Ignacio Olmeda
Introduction 168
Supercomputing Technologies 169
Graphics Processing Unit Computing 171
An Example 174
Conclusion 182
References 182

PART 2

RISK AND ASSET MANAGEMENT

Chapter 10

Value-at-Risk–Based Stop-Loss Trading 187
Bernd Scherer
Introduction 188
Stop-Loss Rules for Alternative Return Processes 189
Some Well-known Strategies 192
Conditional Autocorrelation: Threshold Autoregressive Models 196
Conclusion 202
References 203
Appendix: Currency Universe and Data Availability 205

Chapter 11

Modeling Portfolio Risks with Time-Dependent Default Rates in Venture Capital 207
Andreas Kemmerer, Jan Rietzschel, and Henry Schoenball
Introduction 208
Chapter 12

Risk Aggregation and Computation of Total Economic Capital  
_Peter Grundke_

Introduction  
Additive Approach  
Correlation-Based Square-Root Formula  
Top-Down Approach  
Bottom-Up Approach  
Conclusion  
References

Chapter 13

Value at Risk for High-Dimensional Portfolios:  
A Dynamic Grouped t-Copula Approach  
_Dean Fantazzini_

Introduction  
Dynamic Grouped t-Copula Modeling: Definition and Estimation  
Simulation Studies  
Empirical Analysis  
Conclusion  
References  
Appendix: List of Analyzed Stocks

Chapter 14

A Model to Measure Portfolio Risks in Venture Capital  
_Andreas Kemmerer_

Introduction  
Toward a Risk Model in Venture Capital  
A Risk Model for Venture Capital
Chapter 15

Risk Measures and Their Applications in Asset Management 311
S. Ilker Birbil, Hans Frenk, Bahar Kaynar, and Nilay Noyan
Introduction 312
Risk Measures 315
A Single-Period Portfolio Optimization Problem 320
Elliptical World 324
Modified Michelot Algorithm 328
Computational Results 331
Conclusion 336
References 336

Chapter 16

Risk Evaluation of Sectors Traded at the ISE with VaR Analysis 339
Mehmet Orhan and Gökhan Karaahmet
Introduction 339
Value-at-Risk Comparison of Sectors Traded at the Istanbul Stock Exchange (ISE) 343
Performance of VaR in Evaluating Risk 350
Conclusion 356
References 357

PART THREE

MODELING

Chapter 17

Aggregating and Combining Ratings 361
Rafael Weißbach, Frederik Kramer, and Claudia Lawrenz
Introduction 362
Chapter 18

Risk-Managing the Uncertainty in VaR Model Parameters 385
Jason C. Hsu and Vitali Kalesnik
The Subprime Crisis of 2008 386
Parameter Uncertainty 389
An Illustrative Example with Mean Uncertainty 390
An Illustrative Example with Variance Uncertainty 394
An Illustrative Example with Correlation Uncertainty 396
Conclusion 398
Acknowledgment 400
References 400

Chapter 19

Structural Credit Modeling and Its Relationship To Market Value at Risk: An Australian Sectoral Perspective 403
David E. Allen and Robert Powell
Introduction 404
Structural Model 406
Methodology 407
Results 410
Conclusion 412
References 412

Chapter 20

Model Risk in VAR Calculations 415
Peter Schaller
Introduction 415
Sources of Model Risk 416
Chapter 21

Option Pricing with Constant and Time-Varying Volatility  439
Willi Semmler and Karim M. Youssef

Introduction  439
The Black–Scholes PDE  441
Solution Methods  444
What We Get and What We Do Not Get from Black–Scholes  447
Seeking Sigma  448
Historical Volatility  449
GARCH(1,1)  450
Heston’s Volatility  452
The Heston Valuation Equation  453
Calibrating the Heston Parameters and Results  457
Conclusion  460
References  460

Chapter 22

Value at Risk under Heterogeneous Investment Horizons and Spatial Relations  463
Viviana Fernandez

Introduction  464
Methodological Issues  466
Empirical Testing of Spatial Linkages  471
Conclusion  480
References  481
Chapter 23

Erick W. Rengifo and Emanuela Trifan

Introduction 486
Theoretical Model 487
Application 500
Conclusion 510
References 511

INDEX 513