CFA INSTITUTE INVESTMENT PERSPECTIVES

Risk Management

Foundations for a Changing Financial World

Walter V. "Bud" Haslett Jr., CFA, Editor

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FOREWORD

Although risk management has always been an integral part of the investment management process, it has certainly become more prominent in recent years. By properly measuring and managing risk, the needs of clients and firms can be more effectively addressed. As the ever-evolving financial markets become more sophisticated and challenging, the application of risk management techniques must also evolve. This book traces that evolution from the perspective of some of the greatest minds in the investment management business.

The 53 individual chapters included in this book highlight two decades of risk management thought. They are taken from the Research Foundation of CFA Institute, *Financial Analysts Journal*, and CFA Institute conference proceedings series. The pieces represent works by Nobel Prize winners, industry legends, and a host of insightful academics and practitioners. The reader will be struck by the timelessness of the principles: An article written in the throes of the 1997 Asian currency crisis could easily be mistaken for one written after the most recent global financial meltdown.

The chapters are organized into three main sections. The first section provides an introduction and overview of risk management thought. The second section, which investigates the measurement of risk, focuses on risk modeling; it addresses such topics as value at risk, risk budgeting, and liquidity risk. The third section concentrates on risk management and issues related to asset classes, such as alternative investments. In addition, derivatives are explored, as well as the topical areas of credit, global, nonfinancial, and pension risk.

Risk Management: Foundations for a Changing Financial World represents the third in our CFA Institute Investment Perspectives Series and joins our previous works on private wealth management and investment performance management. We hope you will find it a useful guide and resource in addressing current issues as well as the many risk management challenges you may face in the future.

Robert R. Johnson, PhD, CFA
Senior Managing Director
CFA Institute

ACKNOWLEDGMENTS

It has been one of the greatest honors of my professional career to review and select the risk management works included in this book. My sincerest appreciation goes out to CFA Institute for entrusting me with this great responsibility. In particular, I would like to thank Heather Packard; Stephen Horan, PhD, CFA; and Rodney Sullivan, CFA, for all of their help along the way, and Tom Robinson, PhD, CFA, and John Rogers, CFA, whose division and organization, respectively, green-lighted the project. In addition, many thanks to Bob Johnson, PhD, CFA, who wrote the Foreword to this book; and Peter Went, PhD, CFA, who co-wrote the Introduction.

Special acknowledgment goes out to the contributors who provided the valuable insights that we are so very proud to share with you and to everyone involved with the *Financial Analysts Journal, Conference Proceedings Quarterly,* and Research Foundation of CFA Institute for making the publication of this information possible. John Wiley & Sons' excellent contribution to the actual publication of this book must also be recognized.

I would also like to thank everyone who has contributed knowledge to the field of risk management and to the Global Association of Risk Professionals (GARP) and the Professional Risk Managers International Association (PRMIA) for their excellent work. Risk management affects all of us in the investment business, and it is through global cooperation that we can all benefit from what has been learned in this field and what will be learned in the future.

WALTER V. "BUD" HASLETT JR., CFA

CONTENTS

Foreword xiii

Acknowledgments xv

Introduction 1

PART I: OVERVIEW—TWO DECADES OF RISK MANAGEMENT 5

1990–1999

CHAPTER 1
A Framework for Understanding Market Crisis 7
Richard M. Bookstaber
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):7–19.*

CHAPTER 2
Practical Issues in Choosing and Applying Risk Management Tools 25
Jacques Longerstaey
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):52–61.*

CHAPTER 3
The Three P's of Total Risk Management 39
Andrew W. Lo
Reprinted from the Financial Analysts Journal *(January/February 1999):13–26.*

CHAPTER 4
Reporting and Monitoring Risk Exposure 61
Robert W. Kopprasch, CFA
Reprinted from AIMR Conference Proceedings: Risk Management *(April 1996): 25–33.*

2000–Present

CHAPTER 5
Risk Management: A Review 73
Sébastien Lleo, CFA
Modified from The Research Foundation of CFA Institute (February 2009).

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CHAPTER 6
Defining Risk 113
Glyn A. Holton
Reprinted from the Financial Analysts Journal *(November/December 2004): 19–25.*

CHAPTER 7
Value and Risk: Beyond Betas 125
Aswath Damodaran
Reprinted from the Financial Analysts Journal *(March/April 2005):38–43.*

CHAPTER 8
A Simple Theory of the Financial Crisis; or, Why Fischer Black Still Matters 133
Tyler Cowen
Reprinted from the Financial Analysts Journal *(May/June 2009):17–20.*

CHAPTER 9
Managing Firm Risk 139
Bluford H. Putnam
Reprinted from AIMR Conference Proceedings: Ethical Issues for Today's Firm *(July 2000):51–61.*

CHAPTER 10
Risk Measurement versus Risk Management 153
D. Sykes Wilford
Reprinted from AIMR Conference Proceedings: Improving the Investment Process through Risk Management *(November 2003):17–21.*

PART II: MEASURING RISK 161

CHAPTER 11
What Volatility Tells Us about Diversification and Risk Management 163
Max Darnell
Reprinted from CFA Institute Conference Proceedings Quarterly *(September 2009):57–66.*

CHAPTER 12
Risk^2: Measuring the Risk in Value at Risk 175
Philippe Jorion
Reprinted from the Financial Analysts Journal *(November/December 1996): 47–56.*

CHAPTER 13
How Risk Management Can Benefit Portfolio Managers 189
Michelle McCarthy
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):62–72.*

CHAPTER 14
Merging the Risk Management Objectives of the Client and Investment Manager 205
Bennett W. Golub
Reprinted from AIMR Conference Proceedings: Exploring the Dimensions of Fixed-Income Management *(March 2004):13–23.*

CHAPTER 15
The Mismeasurement of Risk 219
Mark Kritzman, CFA, and Don Rich
Reprinted from the Financial Analysts Journal *(May/June 2002):91–99.*

CHAPTER 16
Riskiness in Risk Measurement 233
Roland Lochoff
Reprinted from AIMR Conference Proceedings: Exploring the Dimensions of Fixed-Income Management *(March 2004):40–51.*

CHAPTER 17
The Second Moment 249
Don Ezra
Reprinted from the Financial Analysts Journal *(January/February 2009): 34–36.*

CHAPTER 18
The Sense and Nonsense of Risk Budgeting 253
Arjan B. Berkelaar, CFA, Adam Kobor, CFA, and Masaki Tsumagari, CFA
Reprinted from the Financial Analysts Journal *(September/October 2006): 63–75.*

CHAPTER 19
Understanding and Monitoring the Liquidity Crisis Cycle 273
Richard Bookstaber
Reprinted from the Financial Analysts Journal *(September/October 2000):17–22.*

CHAPTER 20
Why Company-Specific Risk Changes over Time 283
James A. Bennett, CFA, and Richard W. Sias
Reprinted from the Financial Analysts Journal *(September/October 2006): 89–100.*

CHAPTER 21
Black Monday and Black Swans 301
John C. Bogle
Reprinted from the Financial Analysts Journal *(March/April 2008):30–40.*

CHAPTER 22
The Uncorrelated Return Myth 317
Richard M. Ennis, CFA
Reprinted from the Financial Analysts Journal *(November/December 2009):6–7.*

PART III: MANAGING RISK 321

Alternative Investments

CHAPTER 23
Risk Management for Hedge Funds: Introduction and Overview 323
Andrew W. Lo
Reprinted from the Financial Analysts Journal *(November/December 2001): 16–33.*

CHAPTER 24
Risk Management for Alternative Investment Strategies 353
Leslie Rahl
Reprinted from AIMR Conference Proceedings: Exploring the Dimensions of Fixed-Income Management *(March 2004):52–62.*

CHAPTER 25
Sources of Change and Risk for Hedge Funds 367
Clifford S. Asness
Reprinted from CFA Institute Conference Proceedings: Challenges and Innovation in Hedge Fund Management *(August 2004):4–9, 13–14.*

CHAPTER 26
Risk Management in a Fund of Funds 379
S. Luke Ellis
Reprinted from CFA Institute Conference Proceedings: Challenges and Innovation in Hedge Fund Management *(August 2004):31–39.*

CHAPTER 27
Hedge Funds: Risk and Return 391
Burton G. Malkiel and Atanu Saha
Reprinted from the Financial Analysts Journal *(November/December 2005): 80–88.*

Credit Risk

CHAPTER 28
Credit Risk 407
Jeremy Graveline and Michael Kokalari
Modified from The Research Foundation of CFA Institute (November 2006).

CHAPTER 29
Tumbling Tower of Babel: Subprime Securitization and the Credit Crisis 427
Bruce I. Jacobs
Reprinted from the Financial Analysts Journal *(March/April 2009):17–30.*

CHAPTER 30
Applying Modern Risk Management to Equity and Credit Analysis 447
Robert C. Merton
Reprinted from CFA Institute Conference Proceedings Quarterly *(December 2007):14–22.*

Derivatives

CHAPTER 31
The Uses and Risks of Derivatives 459
Joanne M. Hill
Reprinted from AIMR Conference Proceedings: Investing Worldwide VI *(January 1996):46–58.*

CHAPTER 32
Effective Risk Management in the Investment Firm 475
Mark C. Brickell
Reprinted from AIMR Conference Proceedings: Risk Management *(April 1996):48–55.*

CHAPTER 33
Risk-Management Programs 487
Maarten Nederlof
Reprinted from AIMR Conference Proceedings: Risk Management *(April 1996):15–24.*

CHAPTER 34
Does Risk Management Add Value? 501
Charles W. Smithson
Reprinted from AIMR Conference Proceedings: Corporate Financial Decision Making and Equity Analysis *(July 1995):47–53.*

CHAPTER 35
Risk Management and Fiduciary Duties 511
Robert M. McLaughlin
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):20–31.*

Global Risk

CHAPTER 36
Financial Risk Management in Global Portfolios 529
R. Charles Tschampion, CFA
Reprinted from AIMR Conference Proceedings: Investing Worldwide VI *(January 1996):67–73.*

CHAPTER 37
Universal Hedging: Optimizing Currency Risk and Reward in International Equity Portfolios **539**
Fischer Black
Reprinted from the Financial Analysts Journal *(July/August 1989):16–22.*

CHAPTER 38
Strategies for Hedging **551**
Mark P. Kritzman, CFA
Reprinted from AIMR Conference Proceedings: Managing Currency Risk *(November 1997):28–38.*

CHAPTER 39
Currency Risk Management in Emerging Markets **567**
H. Gifford Fong
Reprinted from AIMR Conference Proceedings: Investing Worldwide VII *(September 1996):18–23.*

CHAPTER 40
Managing Geopolitical Risks **573**
Marvin Zonis
Reprinted from CFA Institute Conference Proceedings Quarterly *(September 2009):22–29.*

CHAPTER 41
Country Risk in Global Financial Management **583**
Claude B. Erb, CFA, Campbell R. Harvey, and Tadas E. Viskanta
Reprinted from The Research Foundation of CFA Institute (January 1998).

CHAPTER 42
Political Risk in the World Economies **651**
Marvin Zonis
Reprinted from AIMR Conference Proceedings: Investing Worldwide VIII: Developments in Global Portfolio Management *(September 1997):1–6.*

Nonfinancial Risk

CHAPTER 43
A Behavioral Perspective on Risk Management **657**
Andrew W. Lo
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):32–37.*

CHAPTER 44
Behavioral Risk: Anecdotes and Disturbing Evidence **667**
Arnold S. Wood
Reprinted from AIMR Conference Proceedings: Investing Worldwide VI *(January 1996):74–78.*

CHAPTER 45
The Ten Commandments of Operational Due Diligence 673
Robert P. Swan III
Reprinted from CFA Institute Conference Proceedings: Challenges and Innovation in Hedge Fund Management *(August 2004):47–52.*

CHAPTER 46
Models 681
Emanuel Derman
Reprinted from the Financial Analysts Journal *(January/February 2009):28–33.*

CHAPTER 47
The Use and Misuse of Models in Investment Management 689
Douglas T. Breeden
Reprinted from CFA Institute Conference Proceedings Quarterly *(December 2009): 36–45.*

CHAPTER 48
Regulating Financial Markets: Protecting Us from Ourselves and Others 701
Meir Statman
Reprinted from the Financial Analysts Journal *(May/June 2009):22–31.*

Pension Risk

CHAPTER 49
Budgeting and Monitoring Pension Fund Risk 715
William F. Sharpe
Reprinted from the Financial Analysts Journal *(September/October 2002):74–86.*

CHAPTER 50
The Plan Sponsor's Perspective on Risk Management Programs 735
Desmond Mac Intyre
Reprinted from AIMR Conference Proceedings: Risk Management: Principles and Practices *(August 1999):38–44.*

CHAPTER 51
Evaluating a Risk-Management Program 745
Christopher J. Campisano, CFA
Reprinted from AIMR Conference Proceedings: Risk Management *(April 1996):41–47.*

CHAPTER 52
Developing and Implementing a Risk-Budgeting System 755
Leo J. de Bever
Reprinted from AIMR Conference Proceedings: Improving the Investment Process through Risk Management *(November 2003):62–72.*

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CHAPTER 53
Liability-Driven Investment Strategies for Pension Funds 771
Roman von Ah
Reprinted from CFA Institute Conference Proceedings Quarterly *(December 2008):39–46.*

About the Contributors 781

Index 783

INTRODUCTION

Risk is an integral part of virtually every decision we make. In a modern portfolio theory framework, risk and return are two required inputs as we seek to maximize returns at a given level of risk. This task is further simplified by the assumption that an asset providing a higher rate of return is riskier than an asset providing a lower rate of return. In this process, risk is assumed to be known and quantified. Standard deviation, variance, and volatility offer simple and tangible metrics to quantify the amount of risk at play.

Because risk is quantifiable, it should be easily predictable and readily manageable. Using various statistical and nonstatistical approaches, risk measures can be calculated and used to predict the impact risks may have on the performance of the portfolio. These methods allow for managing the risks that *we know that we know*, such as small price and yield changes. For this task, we can use the various financial tools that have developed over the years to manage the effects of these types of risks.

How to manage the risks that *we know that we do not know* remains a challenge, even though reoccurring financial crises generously generate ample data to analyze, observe, and extrapolate.

But the real challenge in managing risks in investment management is managing and measuring the impact of risks that *we do not know that we do not know*. These risks, such as extreme tail risks or black swan events, are risks that we cannot fully comprehend, imagine, or possibly conceive in advance. These types of risks are made even more challenging by the fact that they fail to occur independently and often experience significant and rapidly shifting correlation between various risk events. Although a skilled risk manager could compute, with relative ease, the separate impact of each of these risks in advance, the collective effect of these events would be almost impossible to quantify and predict.

Because risk management is about learning from experience, the difference between good and bad risk management is how to best consider risk in the context of the investment decision-making process. Even if all possible risks are known in advance, are quantifiable, and are considered, some remaining challenges can affect the outcome. Equity prices, interest rates, and foreign exchange rates are innately volatile, and this continuous, unpredictable, and unexpected volatility is a fact of life. As long as these changes are small and not significant, the existing risk metrics and risk management tools available to manage these everyday risk events should be adequate. But oftentimes these changes are not insignificant. It appears that, in managing risks, the only certainty is that risks are uncertain.

The chapters in this book summarize much of our current knowledge and understanding of risks and risk management. The permanence of risk shines through in each of them. This enduring nature is particularly evident when comparing the risk events in the 1990s with those of the events of the latter half of the first decade of the 2000s. The lessons were there for all to see and learn, and they remind us that there are more lessons to learn.

In the Overview (Part I) of the book, we first address lessons learned from the 1990s with articles and conference proceedings from Richard Bookstaber, Jacques Longerstaey, Andrew Lo, and Robert Kopprasch, CFA. The 1990s was a decade dominated by Barings Bank, Long-Term Capital Management, and the Asian contagion, and many of these works reflect lessons learned directly from those incidents. From discussions on liquidity to the organizational structure needed to effectively manage risk, these chapters provide timeless insights for all investment professionals.

The second portion of the Overview (2000 to the present) begins with a comprehensive Research Foundation piece by Sébastien Lleo, CFA, and is followed by works from Glyn Holton, Aswath Damodaran, Tyler Cowen, Bluford Putnam, and Sykes Wilford. Besides being affected by the decade's events, such as the bursting of the tech bubble and the housing crisis, these chapters include a healthy discussion of the qualitative nature of risk management, which is an important theme running throughout the book. To be successful, risk management needs to contain a strong quantitative component, but if viewed in isolation, these measures alone will be inadequate. It is when the quantitative measures are combined with well-informed qualitative insights that risk management can become truly effective.

Works from Max Darnell; Philippe Jorion; Michelle McCarthy; Bennett Golub; Mark Kritzman, CFA, and Don Rich; Roland Lochoff; Don Ezra; Arjan Berkelaar, CFA, Adam Kobor, CFA, and Masaki Tsumagari, CFA; Richard Bookstaber; James Bennett, CFA, and Richard Sias; John Bogle; and Richard Ennis, CFA, in Part II: Measuring Risk address many quantitative aspects of risk management, including limitations of popular measures and the dangers of extreme events (such as the previously mentioned tail risk and black swan events). Correlated and uncorrelated returns as well as analysis of volatility are also discussed in this section.

In Part III: Managing Risk, a broad grouping of chapters is organized into several different subsections. Because of the increasing importance and complexity of alternative investment strategies, Andrew Lo, Leslie Rahl, Clifford Asness, Luke Ellis, and Burton Malkiel and Atanu Saha discuss the unique risk issues in this area. Nonnormal distributions, distinct characteristics of hedge funds and fund-of-funds investments, and the question of return persistency are all discussed in these timely works.

Jeremy Graveline and Michael Kokalari, Bruce Jacobs, and Robert Merton discuss credit risk in a grouping of chapters covering such topics as collateralized debt obligations (CDOs), credit default swaps (CDSs), and the pricing of credit risk. These more recent chapters precede and follow the credit crisis and provide an eye-opening analysis of developments before, during, and after this most challenging period of time.

The nature of the financial crisis and the regulatory debates of 2008 and 2009 cry out for special attention to derivatives, which are discussed by Joanne Hill, Mark Brickell, Maarten Nederlof, Charles Smithson, and Robert McLaughlin. Again, the reader will note the vintage of some of these works and the power of their insights. It is truly remarkable how many of the derivatives issues of the past (such as rising correlations in a time of crisis, impact of outlier events, and fiduciary responsibilities) are still derivatives issues of the present, despite the passing of more than a decade.

The timelessness of risk management principles is also apparent in the Global Risk subsection, which features articles from Charles Tschampion, CFA; Fischer Black; Mark Kritzman, CFA; Gifford Fong; Marvin Zonis; and Claude Erb, CFA, Campbell Harvey, and Tadas Viskanta. Global investing has expanded dramatically over the past 20 years, yet these articles are still providing a wealth of information for dealing with the challenges of increasing currency volatility, sovereign risk, and the many other intricacies we face in our increasingly global economies and investment universe.

Works in the Nonfinancial Risk subsection of Managing Risk are from such notable experts as Andrew Lo, Arnold Wood, Robert Swan, Emanuel Derman, Douglas Breeden, and Meir Statman and address many operational, behavioral, and model risk issues not covered in other sections. The challenges during the credit crisis highlighted many of these issues, and particular attention to the concepts will assist with developing a framework to minimize such negative impacts in the future.

Rounding out the Managing Risk section is the subsection Pension Risk, with works from William Sharpe; Desmond Mac Intyre; Christopher Campisano, CFA; Leo de Bever; and Roman von Ah. From manager and marginal risk to liability-driven investing, as an increasingly large group of the global population enters and approaches retirement age, these issues are sure to provide valuable insights into this critically important area.

The risk involved with using timeless articles is that, although the concepts are fundamentally sound, the data are dated. This is particularly true of the "Country Risk in Global Financial Management" and Fischer Black chapters. Nonetheless, the data serve as a trip down memory lane for those who experienced the information firsthand, or provide a valuable reference point for those who were not involved in the investment business at that time.

Any emphasis implied by either the number of articles or the number of pages in any particular section is unintentional because all topics addressed are important to risk management. Risk, like water, tends to seek out and find weaknesses in structure, and so strength in all areas is the best defense against the unintended ravages that poor risk management can bring.

Because risk management affects so many areas of investment management, the information in this book will provide value to a broad cross section of investment professionals. We are delighted to present this timeless wealth of information for all to use and enjoy, and we hope the insights learned will lead to much success for you, your clients, and your firm.

Walter V. "Bud" Haslett Jr., CFA
Peter Went, PhD, CFA

PART I

OVERVIEW—TWO DECADES OF RISK MANAGEMENT

1990–1999

Chapter 1 A Framework for Understanding Market Crisis 7

Chapter 2 Practical Issues in Choosing and Applying Risk Management Tools 25

Chapter 3 The Three P's of Total Risk Management 39

Chapter 4 Reporting and Monitoring Risk Exposure 61

2000–Present

Chapter 5 Risk Management: A Review 73

Chapter 6 Defining Risk 113

Chapter 7 Value and Risk: Beyond Betas 125

Chapter 8 A Simple Theory of the Financial Crisis; or, Why Fischer Black Still Matters 133

Chapter 9 Managing Firm Risk 139

Chapter 10 Risk Measurement versus Risk Management 153

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