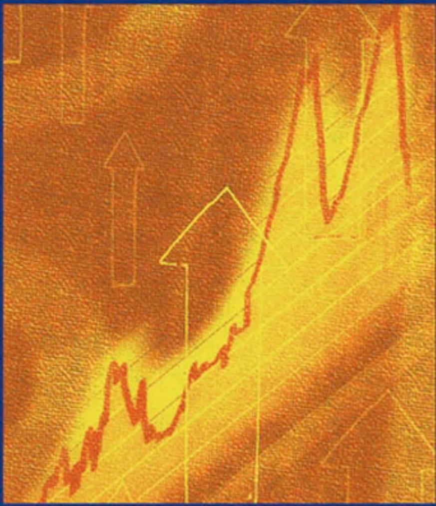
THE FRANK J. FABOZZI SERIES

Market Neutral Strategies

WILEY FINANCE



Bruce I. Jacobs & Kenneth N. Levy editors

With a Foreword by Mark Anson, PhD, Chief Investment Officer, CalPERS

Additional Praise for *Market Neutral Strategies*

"*Market Neutral Strategies* surpasses its mission. Bruce Jacobs, Ken Levy, and their contributing authors elucidate the sources of potential alpha for a breadth of strategies, as well as the origins of prior miscues. At long last there is a single volume that is a practical and comprehensive guide for investors who want to explore or to learn more about market neutral and a valuable reference for seasoned investors."

—Edgar J. Sullivan, Ph.D., CFA, Managing Director,
Absolute Return Strategies,
General Motors Asset Management

"Jacobs and Levy have once again shown their commitment to advancing the practice of investment management by producing a comprehensive, thought-leading treatment of market neutral investing. The well-selected authors provide timely guidance on what we as institutional investors are challenged to think and act upon—namely, a clear understanding of the various sources of risk, the decisions to be taken between market (beta) and active (alpha) risk, and the application of the same in the prudent allocation of risk within our portfolios."

—Thomas F. Obsitnik, CFA, Investment Advisor,
Pension and Benefit Investments,
Eli Lilly and Company

"Many institutional investors are attracted to market neutral strategies, not only because of their impressive performance, but also because they enable investors to separate management of market risk (beta) from selection risk (alpha). In *Market Neutral Strategies*, an impressive line-up of respected practitioners provides an excellent overview of all major aspects of these strategies. Importantly, the book underscores that their power lies in an integrated approach and not a simple combination of long and short portfolios—a fact too often ignored. This excellent and highly relevant publication provides practical answers to practical problems, and I recommend it to every investor interested in implementing a market neutral approach."

—Hans de Ruiter, Senior Portfolio Manager,
ABP Investments

"Bruce Jacobs and Ken Levy's latest book addresses its subject in a characteristically clear, rigorous, and comprehensive fashion. It contains a wealth of insights about market neutral investing from a range of real-life practitioners. I would commend *Market Neutral Strategies* to anyone with the desire or need to gain a sound understanding of the practicalities and potential uses, advantages, and risks of this approach to investing."

—Rick Harper, Chief Executive Officer,
Superannuation Funds of South Australia

"Serious about market neutral investing? This is the best book to date on the nearest of kin to classic arbitrage. The authors are expert, clear, and balanced. The content is rich. The style is rigorous without being academic, and free of superfluous jargon. The autopsies of two failed hedge funds are worth the price of admission. Bruce Jacobs and Ken Levy blazed the trail for institutional market neutral investing; now they illuminate it."

—Richard M. Ennis, CFA, Principal,
Ennis Knupp + Associates

"As arbitrageurs move from the back office to the front page, investors must have resources to guide them. Jacobs and Levy provide a guide that is dense with information, background, and examples. They handle the complex subject of investing in markets while remaining neutral to the whims of those markets at a level the intelligent investor will understand. Moreover, they place market neutral investing in the context of alpha generation and explain its role in asset allocation. Finally, they aid the taxable and tax-exempt investor in navigating the rules of the game. This book is an important tool for maneuvering through market neutral strategies."

—Leola Ross, Ph.D., CFA, Senior Research Analyst,
Russell Investment Group

"At last. A comprehensive book on the challenges and opportunities in market neutral investing, and a roadmap of pitfalls that many would find only by stumbling into them. This would make a nice text for an MBA in finance, and provides a valuable reference for anyone considering investments in the market neutral arena."

—Robert D. Arnott, Chairman, Research Affiliates, LLC,
and Editor, *Financial Analysts Journal*

"Because they have little or no correlation with broad markets, market neutral strategies are sought after by investors who desire active returns that can diversify traditional investment portfolios. *Market Neutral Strategies* provides a comprehensive review of the risks, potential returns, and mechanics of such strategies, drawing on the theoretical and hands-on knowledge of industry experts."

—Harry M. Markowitz, 1990 Nobel Laureate in Economics

"Bruce Jacobs and Ken Levy have done a masterful job of collecting information useful to market neutral investors. The presentation is clear and concise. The topics covered are wide-ranging and up to date, including the current hot topic of alpha transport. My favorite features are the unique question-and-answer sections, which provide answers to typical investor questions in an easily accessible format. Anyone who plans to invest in market neutral strategies should read this book."

—Brian Bruce, Editor-In-Chief, *The Journal of Investing*

"This book contains intuitive, informative, and insightful discussions of major market neutral strategies. Jacobs, Levy, and the other contributors share their own rich and diverse experiences in implementing these strategies in real life. Written in plain English, the book is an invaluable resource for investment professionals dealing with hedge fund strategies."

**—Professor Narayan Y. Naik, Director,
Centre for Hedge Fund Research and Education, London Business School**

"While managing several billion dollars in equities, I became frustrated by the value that I was not allowed to add, because of long-only mandates. The quant models actually worked even better on 'dog' stocks than on 'stars,' but without short selling, the additional information was useless. Even worse were the tracking error constraints that forced me to go down with the market as it collapsed. *Market Neutral Strategies* will do much to promote and increase the acceptability of alternative strategies, to the benefit of all investors. As always, Bruce Jacobs and Ken Levy are clear, focused, sharp, and insightful. Combine this with their plain English expositions and avoidance of esoteric theory, and you have a 'must read' for any serious investor."

**—Les Balzer, Professor of Finance, The University of New South Wales
and Head of Research, Hedge Funds of Australia Limited**

"This book is a must read for all contemplating market neutral strategies. It shows how an optimized combination of long and short positions can exploit both quantitative and qualitative insights about relative security valuations. Because many investors cannot act on negative insights by selling short, there are more opportunities on the short side. Thus those who can sell short, and who know how to integrate their short positions with their long positions, are at a major advantage."

**—Edward M. Miller, Research Professor of Economics and Finance,
University of New Orleans**

"Transparency is rare in financial markets, but you will find it in this book. Jacobs, Levy, and their coauthors are lucid in their descriptions of the benefits of market neutral strategies, and they are equally lucid in their descriptions of the risks and failures. I enjoyed *Market Neutral Strategies* and highly recommend it."

—Meir Statman, Glenn Klimek Professor of Finance, Santa Clara University

"For decades, Bruce Jacobs and Ken Levy have provided awesome thought leadership to the financial industry in an easy-to-read format. This book continues that marvelous tradition, giving readers an insider's look at market neutral investing."

—Wayne H. Wagner, Chairman, Plexus Group, Inc.

"*Market Neutral Strategies* illuminates for the serious investor the techniques, benefits, and risks of the various methods of market neutral investing. It also shows the many possible gains from using market neutral strategies as part of an investor's total portfolio. The insights are valuable for understanding all types of hedge funds."

—Edward O. Thorp, Ph.D., Edward O. Thorp Associates, and Author of *Beat the Dealer*

Market Neutral Strategies

THE FRANK J. FABOZZI SERIES

Fixed Income Securities, Second Edition by Frank J. Fabozzi
Focus on Value: A Corporate and Investor Guide to Wealth Creation by James L. Grant and James A. Abate
Handbook of Global Fixed Income Calculations by Dragomir Krgin
Managing a Corporate Bond Portfolio by Leland E. Crabbe and Frank J. Fabozzi
Real Options and Option-Embedded Securities by William T. Moore
Capital Budgeting: Theory and Practice by Pamela P. Peterson and Frank J. Fabozzi
The Exchange-Traded Funds Manual by Gary L. Gastineau
Professional Perspectives on Fixed Income Portfolio Management, Volume 3 edited by Frank J. Fabozzi
Investing in Emerging Fixed Income Markets edited by Frank J. Fabozzi and Efstathia Pilarinu
Handbook of Alternative Assets by Mark J. P. Anson
The Exchange-Traded Funds Manual by Gary L. Gastineau
The Global Money Markets by Frank J. Fabozzi, Steven V. Mann, and Moorad Choudhry
The Handbook of Financial Instruments edited by Frank J. Fabozzi
Collateralized Debt Obligations: Structures and Analysis by Laurie S. Goodman and Frank J. Fabozzi
Interest Rate, Term Structure, and Valuation Modeling edited by Frank J. Fabozzi
Investment Performance Measurement by Bruce J. Feibel
The Handbook of Equity Style Management edited by T. Daniel Coggin and Frank J. Fabozzi
The Theory and Practice of Investment Management edited by Frank J. Fabozzi and Harry M. Markowitz
Foundations of Economic Value Added: Second Edition by James L. Grant
Financial Management and Analysis: Second Edition by Frank J. Fabozzi and Pamela P. Peterson
Measuring and Controlling Interest Rate and Credit Risk: Second Edition by Frank J. Fabozzi, Steven V. Mann, and Moorad Choudhry
Professional Perspectives on Fixed Income Portfolio Management, Volume 4 edited by Frank J. Fabozzi
The Handbook of European Fixed Income Securities edited by Frank J. Fabozzi and Moorad Choudhry
Credit Derivatives: Instruments, Applications, and Pricing by Mark J.P. Anson, Frank J. Fabozzi, Moorad Choudhry, and Ren-Raw Chen
Handbook of European Structured Financial Products edited by Frank J. Fabozzi and Moorad Choudhry
The Mathematics of Financial Modeling and Investment Management by Sergio M. Focardi and Frank J. Fabozzi
Short Selling: Strategies, Risks, and Rewards edited by Frank J. Fabozzi

Market Neutral Strategies

BRUCE I. JACOBS

KENNETH N. LEVY

EDITORS

John Wiley & Sons, Inc.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey
Published simultaneously in Canada

For general information on our other products and services, or technical support, please contact our Customer Care Department within the United States at 800-762-2974, outside the United States at 317-572-3993 or fax 317-572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

For more information about Wiley products, visit our web site at www.wiley.com.

ISBN: 0-471-26868-2

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

To Ilene, Lauren, Julie, Sam, and Erica Jacobs and
Frayda, Kara, Max, Brenda, and Hannah Levy
For their love, patience, and support

Contents

Foreword

Mark Anson, Ph.D., CFA, CPA, Esq.
Chief Investment Officer
CalPERS*

Most investors, when they hear the term "market neutral," think of strategies that simultaneously go long and short equities in order to eliminate stock market risk. True enough. But *Market Neutral Strategies* goes beyond equities to provide a comprehensive review of the full range of these strategies.

One of the great strengths of this book is that it is user friendly. Jacobs and Levy and the other contributing authors do not try to dazzle the reader with arcane nomenclature or turbo-charged math. Instead, they break down each market neutral strategy into easy-to-understand concepts that any reader can grasp. The book provides a clear explanation of the economic drivers associated with each market neutral strategy. It also looks at the risks, as well as the returns, associated with each strategy.

The chapter on merger arbitrage, for example, explains the economic rationale for how merger arbitrageurs make money: essentially, they are insurance agents who collect premiums by writing insurance against failed merger attempts. Placing merger arbitrage in this context allows the reader to quickly grasp how the strategy works, as well as to develop an expectation regarding the returns that can be earned. Insurance companies earn consistent, but moderate, returns.

---

* This foreword reflects the thoughts and opinions of Mark Anson, and not those of his employer.

Another chapter describes how to establish a market neutral strategy in convertible bonds. This strategy may require hedging in both the bond and the stock market to insulate a portfolio from financial market moves. An early chapter of the book provides a great "Q&A" that highlights many of the issues that are discussed in more detail in the following chapters.

All in all, I found *Market Neutral Strategies* to be an excellent reference book, and I intend to keep it close by on my shelf of required reading.

Acknowledgments

This book would not exist without the contributions of our coauthors. We thank Jane Buchan of Pacific Alternative Asset Management Company; George E. Hall of the Clinton Group and Seth C. Fischoff; John Maltby of DKR Capital; Daniel S. Och of Och-Ziff Capital Management Group and Todd C. Pulvino of the Kellogg School of Management, Northwestern University, and CNH Partners; and Peter E. Pront, S. John Ryan, and John E. Tavss of the law firm Seward & Kissel. We are indebted to them for sharing their expertise, for putting in the time and effort to write their respective chapters, and for their patience in bearing with us as we pulled the book together.

Additional thanks to Jane Buchan for contributing her experience and insights to "Questions and Answers About Market Neutral Investing." Also, our thanks to Mark Anson, Chief Investment Officer, CalPERS, for providing the foreword.

At Jacobs Levy Equity Management, we thank Judy Kimball for her invaluable contributions in research and editing, and Catherine Basha for her ever-efficient and much-needed administrative support.

Our thanks to Frank Fabozzi for encouraging us to tackle this book and lending us impetus at crucial junctures on the path to publication, and to Pamela van Giessen, Editorial Director, John Wiley & Sons, for help in getting this book done.

Readers may send comments or questions via email to mns@jacobslevy.com, or visit the book's web site at www.jacobslevy.com/mns.

Bruce I. Jacobs
Kenneth N. Levy

About the Editors

Bruce I. Jacobs and Kenneth N. Levy are Principals of Jacobs Levy Equity Management, in Florham Park, New Jersey. Jacobs Levy is widely recognized as a leading provider of quantitative equity strategies for institutional clients. Cofounders Jacobs and Levy developed the concept of "disentangling" stock market inefficiencies in the 1980s, recognized early in the 1990s that the full benefits of combining long and short positions emerge only from an integrated optimization, researched the optimality of market neutral portfolios, and were among the first to offer equitized portfolios able to transport the alpha from market neutral to the equity market. Jacobs Levy currently manages over $15 billion in various strategies for a prestigious global roster of 50 corporate pension plans, public retirement systems, multiemployer funds, endowments, and foundations, including over 25 of *Pensions & Investments*' "Top 200 Pension Funds/Sponsors."

Bruce Jacobs holds a Ph.D. in Finance from the Wharton School of the University of Pennsylvania. He is the author of *Capital Ideas and Market Realities: Option Replication, Investor Behavior, and Stock Market Crashes* (1999) and coauthor, with Kenneth Levy, of *Equity Management: Quantitative Analysis for Stock Selection* (2000). He serves on the advisory board of the *Journal of Portfolio Management*.

Ken Levy holds an M.B.A. and M.A. in Applied Economics from the Wharton School of the University of Pennsylvania. He is coauthor, with Bruce Jacobs, of *Equity Management: Quantitative Analysis for Stock Selection*. A Chartered Financial Analyst, he has served on the CFA Institute's candidate curriculum committee and on the advisory board of POSIT (Portfolio System for Institutional Trading).

Contributing Authors

Jane Buchan	Pacific Alternative Asset Management Company
Seth C. Fischoff	
George E. Hall	Clinton Group, Inc.
Bruce I. Jacobs	Jacobs Levy Equity Management
Kenneth N. Levy	Jacobs Levy Equity Management
John Maltby	DKR Capital Inc.
Daniel S. Och	Och-Ziff Capital Management Group
Peter E. Pront	Seward & Kissel LLP
Todd C. Pulvino	Kellogg School of Management, Northwestern University, and CNH Partners
S. John Ryan	Seward & Kissel LLP
John E. Tavss	Seward & Kissel LLP

CHAPTER 1

Introduction

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

As the cofounders and principals of Jacobs Levy Equity Management, we have been designing, managing, and writing about market neutral equity strategies since 1990. At the beginning, we were one of just a handful of investment advisers offering such strategies for institutional portfolios. Since that time, the demonstrated ability of equity-based and other market neutral strategies to add value has led to increased participation by institutional investors in market neutral hedge funds and increased implementation of market neutral strategies by more traditional money managers.

This book provides a forum in which some of the industry's leading market neutral practitioners discuss the implementation, the benefits, and the risks of market neutral investing. The discussion is directed toward institutional investors, sophisticated individual investors, and investment consultants who seek a deeper understanding of how these strategies can contribute to the pursuit of investment return and the control of investment risk. In this context, the book assumes that readers are familiar with basic investment concepts and practices. Every attempt has been made, however, to explain these strategies in plain English, with minimal resort to mathematics or arcane financial theory.

MARKET NEUTRAL STRATEGIES

Market neutral investing is often identified with hedge fund investing. In fact, the first documented hedge fund, started by A. W. Jones in 1949, was also among the first to employ tactics later used in market neutral investing. Short sales had traditionally been undertaken by dedicated short sellers, investors who sold short particular stocks that they expected to decline in value because of special situations such as accounting fraud. Jones used short sales in a portfolio context, selling securities short in part to offset some of the systematic risk introduced by the long positions in the portfolio.

Market neutral is not synonymous with hedge fund, however. For one thing, an increasing number of traditional money management firms are offering institutional clients market neutral strategies as part of their menu of investment products. These market neutral products are not always structured as limited partnerships and can offer some advantages over hedge fund partnerships, particularly in the area of disclosure (as the latter are subject to only limited disclosure requirements).

Furthermore, most hedge funds are not market neutral. Many, including the so-called macro funds, are market directional, rather than market neutral, designed to exploit changes in market movements. Others, while they may employ market neutral tactics to hedge against movements in underlying markets, are designed to retain significant exposures to those markets. The Jones funds, for example, retained a tilt toward long positions, with short positions of a generally smaller magnitude expanded or contracted depending upon whether Jones expected the broad market to decline or advance. In this sense, Jones was in large measure using a market timing strategy.

Strictly speaking, market neutral strategies are not market timing strategies (although they may be adapted to that end). Rather than seeking to profit from correctly forecasting underlying market moves, market neutral strategies seek to profit from detecting perceived mispricings in individual securities and constructing portfolios that deliver the excess return (and risk) associated with those securities, regardless of underlying market moves. This is accomplished by holding balanced long and short positions in various securities and/or by holding these securities in conjunction with long or short positions in derivative securities so that the overall portfolio's exposure to primary risk factors, such as equity market and interest rate risks, is neutralized.

In this endeavor, market neutral investing employs the same instruments as more conventional strategies. These include equity, government bonds, corporate bonds, mortgage-backed securities, and convertible bonds and warrants. Market neutral investing in general, however, tends to be more reliant on derivative securities than traditional investment approaches. Depending on the particular strategy, market neutral strategies may use equity and bond futures and options, as well as over-the-counter options and interest rate swaps, with or without caps and floors.

Market neutral investing exploits the same methods as more conventional active strategies. It may use in-depth fundamental analysis, technical approaches, and/or quantitative valuation and portfolio construction techniques. Most market neutral strategies rely at least in part on quantitative methods. Quantitative analysis allows for cost-effective and timely analysis of a large number of securities and is (arguably) a requirement for some of the more complex instruments used in market neutral investing, such as collateralized mortgage obligations and options. Quantitative tools such as optimization are vital to ensure proper portfolio construction. This does not mean fundamentals are ignored. Quantitative analyses may incorporate both bottom-up, company-specific fundamentals and top-down, economic fundamentals. Certain market neutral strategies—merger arbitrage, for example, as well as some forms of convertible arbitrage—may be more dependent than others on in-depth fundamental analyses of individual companies and securities.

Market neutral strategies have the same basic aim as more conventional strategies—to "buy low and sell high." In more traditional active approaches, however, the buying and selling are sequential events, whereas in market neutral investing they are more often concurrent. A market neutral investor buys "cheap" securities (or derivatives) and simultaneously sells or sells short an offsetting amount of fundamentally related "rich" securities (or derivatives).

Because of this concurrence of buying and selling, market neutral strategies are often termed "arbitrage" strategies. Market neutral strategies do not fall within the strict definition of classical arbitrage. Classical arbitrage is by definition riskless; buying a particular security at one price in one market and simultaneously selling it at a higher price in another market is classic arbitrage. This book focuses on five market neutral strategies:

- Market neutral equity
- Convertible bond arbitrage
- Government bond arbitrage
- Mortgage-backed securities arbitrage
- Merger arbitrage

These strategies fall within a broad definition of arbitrage in the sense that each makes use of instruments that are related in some fundamental way. The equities held long and sold short in equity market neutral portfolios, for example, are fundamentally related through their exposures to the broad underlying market, while the bonds and fixed-income derivatives used in sovereign fixed-income arbitrage are fundamentally related through their exposures to interest rate movements, and the instruments employed in merger arbitrage are related through the expected convergence of the two companies' share prices. These strategies have also developed performance histories and liquidity adequate for institutional investors.

Additional chapters in this book provide a broader look at market neutral strategies. "Questions and Answers About Market Neutral Investing" answers some frequently asked questions about the strategy in general. "A Tale of Two Hedge Funds" dissects the spectacular failures of two famous "market neutral" funds, Askin Capital Management and Long-Term Capital Management, and their implications for market neutral strategies and investors. "Transporting Alpha" examines market neutral investing in the context of overall fund structure. Two chapters discuss regulatory and tax implications of market neutral strategies.

RISKS

Because market neutral strategies are designed to eliminate systematic risk factors such as stock market or interest rate risk, they are often perceived to be low risk. This is not always the case. As discussed in Chapter 2, "Questions and Answers About Market Neutral Investing," risk levels may vary across different types of market neutral strategies and across portfolios in a given strategy. The risk of any given strategy will depend upon multiple factors, including the volatility of the underlying securities, the sources of uncertainty impacting those securities, the models and methods used in the investment process, and the degree of leverage employed.

In the short term, at least, equities are inherently more volatile than fixed-income instruments, so one may expect market neutral equity strategies to be inherently more volatile than fixed-income strategies. On the other hand, as we explain in Chapter 3, "Market Neutral Equity Investing," a market neutral portfolio can be designed to offer a high expected return at a high risk level or a lower expected return at a lower risk level. Furthermore, the instruments underlying some bond-based strategies, including mortgage and convertible arbitrage, may be subject to extreme bouts of volatility because they include option-like elements that can cause them to behave in nonlinear ways. The chapter on mortgage arbitrage explains the implications of this behavior for market neutral strategies in mortgage-backed securities.

As is any investment strategy, market neutral strategies are subject to uncertainty beyond anticipated volatility. Unexpected events can cause actual portfolio performance to diverge from the expected. Sources of uncertainty and their relative impacts differ across different strategies. Uncertainty can be introduced by unanticipated changes at the company-specific level, by developments in the broader economy, and by regulatory, legal, and credit events.

Jane Buchan's discussion of convertible arbitrage in Chapter 4, for example, discusses the problems created when the company issuing a convertible experiences financial distress. John Maltby in Chapter 5 notes how changes in the yield curve can swamp the expected returns to strategies that exploit perceived mispricings in government bond markets. Merger arbitrage, as Daniel Och and Todd Pulvino make clear in Chapter 7, is particularly susceptible to regulatory risk, as announced mergers may be derailed at several points by the actions of regulatory overseers. For many years, the short sale of equity securities, vital in market neutral equity, convertible bond, and merger arbitrage strategies, was subject to tax risk because of the legal uncertainty over the treatment of short sale proceeds; this is discussed by Peter Pront and S. John Ryan in Chapter 11 covering tax issues for nontaxable investors.

Credit risk, the risk that a counterparty to a trade will default, may be a larger problem for market neutral strategies than for more conventional investment approaches, to the extent that the former rely more heavily on over-the-counter derivatives. Traders using organized exchanges are largely protected against counterparty default by the guarantees provided by exchange clearinghouses. For market neutral strategies that require over-the-counter derivatives such as options and interest rate swaps, due diligence must be conducted to ensure that counterparties are creditworthy.

The primary line of defense against uncertainty is diversification. This is as true in market neutral as in conventional investment strategies. For example, diversification across different securities protects against company-specific risks. Diversification across counterparties may provide some protection against credit risk.

As we show in Chapter 9, "A Tale of Two Hedge Funds," lack of diversification can prove catastrophic. The story of the Long-Term Capital Management hedge fund is particularly interesting because it illustrates how diversification may be not only a matter of the tangible number and variety of securities in a portfolio, but also the intangible ideas behind those securities. In effect, lack of diversification of insights can prove just as damaging as lack of diversification of securities.

The story of Askin Capital Management illustrates another source of potential risk—problems introduced by the investment process itself. Problems at this level may be subtle and difficult to detect. The valuation process, for instance, may omit salient information, or the information used may be incorrect. Models used for valuation, portfolio construction, or risk measurement may be incomplete, inadequate, or simply wrong.

Quantitative investment approaches may have the advantage over more judgmental ones when it comes to detecting and correcting these sources of error. Quantitative approaches to valuation and portfolio management rely on objective inputs and outputs and reproducible processes. They can thus provide a transparent audit trail of cause and effect that can be used to detect and remedy potential trouble spots. It is important, however, that a quantitative approach not devolve into the notorious "black box" that spits out answers to which no one knows the questions.

In general, market neutral strategies are more dependent on leverage than conventional investing. Leverage can take many forms, among them outright borrowing, repo arrangements, purchase of securities on margin, and the short sale of borrowed securities. By increasing the number and size of positions a strategy can take, leverage can increase the return to that strategy, but also the risk. If the strategy performs as expected, leverage will multiply the profits. But it will also multiply the losses if the strategy goes awry. In this sense, leverage magnifies all the risks discussed here.

A leveraged market neutral strategy (or any leveraged investment strategy) in effect invests more money than it has capital. When things go wrong, losses can exceed the invested capital, and as a result the fund can lose more than it started with. Peter Pront and John Tavss discuss, in Chapter 10, this unique result of leverage and the important implications for investors of the legal structure of market neutral investment vehicles.

Leverage also introduces a third party (or multiple third parties) to the investment picnic—a party that may make demands that affect investment performance. With short selling, for example, the owner of the shares sold short may demand them back; in certain instances, the short seller may have to liquidate positions in order to meet this demand, regardless of the impact on the portfolio.

Lenders, brokers, repo parties, and derivatives counterparties may demand repayment or partial repayment of loans or payment of additional collateral when leveraged positions experience losses. Such demands can have disastrous results if they cannot be met via a liquidity reserve, the sale of assets, or an infusion of new capital. In such cases, lenders and other counterparties may liquidate the portfolio, at large losses to investors. It is worth noting that this may happen even in instances in which the portfolio is expected to be profitable in the long run.

As we note in Chapter 3, "Market Neutral Equity Investing," leverage is not a necessary part of all market neutral strategies. In some instances, it may be up to the investor to determine the amount of leverage employed.

In any case, when investigating any strategy (whether market neutral or not), investors should determine whether the strategy employs leverage, the extent to which it does, and the degree to which leverage contributes to the strategy's expected returns. They should also be aware that leverage comes in many forms, and can interact with other risk factors, including liquidity, so as to magnify underlying risks, as well as returns.

BENEFITS

We have just enumerated a seemingly daunting list of risks that market neutral strategies are susceptible to. It is important to recognize, however, that, compared with more conventional investment approaches, when it comes to risk, market neutral strategies differ more in degree than in kind. The proper tools for security valuation and portfolio construction, and discretion in the use of leverage, can keep risks in hand. Furthermore, the risks of market neutral must be weighed against the potential rewards. In this regard, market neutral investing provides some advantages that conventional approaches just can't duplicate.

Because of their ability to deliver returns that are independent of the performance of the underlying market, market neutral strategies have often been offered, and sought after, as "hedges" against market downturns. For this reason, market neutral strategies are often used as a tool for diversification. When added to an institution's existing investments in bonds and stocks, market neutral portfolios may be able to increase overall return and/or reduce risk.

Their potential contribution to overall fund diversification has been one of the primary selling points for market neutral strategies. Market neutral strategies have much to offer beyond diversification, however. For example, to the extent that they neutralize underlying market risk, market neutral strategies can be used to exploit profit opportunities in markets that might otherwise be considered too risky for suitable investment. Chapter 6, by George Hall and Seth Fischoff, on mortgage-backed security arbitrage, demonstrates how longer-term, fixed-rate collateralized mortgage obligations can, within a market neutral portfolio construct, retain the lower-risk, floating-rate characteristics desired by many investors.

Market neutral structures can also allow investors to fine-tune portfolio risk exposures. Daniel Och and Todd Pulvino in Chapter 7, on merger arbitrage, show how market neutral construction enables the investor to exploit price movements related to announced mergers without having to take on the risk of broad market moves. Similarly, Jane Buchan's chapter on convertible bond arbitrage—Chapter 4—shows how investors can reap the returns from convertible securities without having to incur the downside risk of underlying stock price changes.

As well as benefits of risk control, however, market neutral strategies offer advantages in terms of return enhancement. Most obviously, the ability to sell securities short enables the investor to seek out opportunities in overvalued securities, as well as undervalued ones. We hope we make the full extent of this advantage clear in our chapter on market neutral equity investing.

One of the major advantages of market neutral construction is that it allows the investor to extract the return available from selecting securities in one asset class and, by using derivatives, to "transport" that return to an entirely different asset class. When fixed-income futures or swaps, for example, are added to a market neutral equity strategy, any excess return available from the market neutral equity portfolio can be used to enhance a bond market return. This affords a great deal of flexibility in overall fund management. Most importantly, as we explain in our chapter on alpha transport, it allows the investor to reap the rewards of both individual security selection and asset class selection.

CHAPTER 2

Questions and Answers About Market Neutral Investing

Jane Buchan, Ph.D.
Managing Director
Pacific Alternative Asset Management Company

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

This chapter addresses, in a user-friendly, question-and-answer format, some broad issues relating to market neutral investing in general. In particular, what is market neutral? What are its sources of return? What are its risks? How can it fit into an institution's overall investment plan? Answering the questions are: *Jane Buchan, Bruce I. Jacobs,* and *Kenneth N. Levy.*

What is market neutral investing?

Bruce Jacobs: It can be thought of as a portfolio construction technique that encourages the use of both long and short positions, where the securities are selected from a particular asset class, but the risk of the asset class itself is neutralized.

Jane Buchan: So the risk that remains is security selection risk, while the market neutral portfolio is constructed so that its returns are unaffected by the returns of the asset class itself or a given benchmark.

Ken Levy: For instance, a market neutral equity portfolio holds long stocks that are expected to appreciate in value and sells short a roughly equivalent amount of stocks that are expected to perform poorly, keeping the benchmark-relative risks of the long and short positions equal. Gains or losses on the long positions resulting from movements in the general stock market will be approximately offset by similar-size losses or gains on the short positions, leaving the spread between the returns on the long and short positions. If the securities behave as expected, with the longs outperforming the shorts, this spread will result in a positive return from security selection. Market neutral bond portfolios can be constructed in a similar fashion to be neutral to movements in underlying interest rates.

Buchan: There are also somewhat more specialized market neutral strategies, such as merger, or "risk," arbitrage. In merger arbitrage, the investor buys the stocks of companies that are takeover targets and sells short the stocks of companies that are the potential buyers. The overall portfolio will be roughly immune to movements in the general market, as any changes in the values of the stocks resulting from general market movements will cancel out, long and short, while the portfolio will benefit if its constituent stocks perform as expected, with the stocks of the takeover candidates rising in price as the takeover approaches and the stocks of the potential buyers falling upon completion of the takeover.

So it's a matter of buying undervalued securities and selling short overvalued securities?

Jacobs: It is generally perceived to be a valuation strategy. In some market neutral strategies, however, the trading component can be the primary driver of profitability. For example, suppose an option is trading "rich" relative to the underlying security; one could short the option, acquire the underlying security, trade to rebalance the hedge over the life of the option, and unwind at a profit when the option matures. This type of option arbitrage is a valuation strategy, in the sense that the investment decision is based on relative valuation of the option and the underlying, but it is very trading intensive, with the timing of trades and minimization of trading costs being critical. The strategy may be considered to be more reliant on time and place advantages (with options traders in the pit having the upper hand) than on valuation. In general, however, most market neutral strategies do rely on discerning securities that are misvalued on a fundamental basis.

How, then, does market neutral differ from a typical strategy?

Buchan: With traditional investing, the main issue is whether the security or securities held are going to go up or down in absolute terms. In market neutral investing, the focus is on *relative* valuation. (In fact, market neutral is sometimes called "relative value" investing.) This isn't so different from what many large institutional investors are already doing, when they manage their portfolios and measure performance relative to an underlying market benchmark, such as the S&P 500. Market neutral, however, goes one step further by essentially eliminating the market benchmark.

So market movements have no effect on the market neutral portfolio?

Levy: Market neutral portfolios are designed to offer performance that is independent of broad market moves. As with any investment strategy, the ability of market neutral to achieve its goal depends on the insights underlying the strategy and on proper implementation. In addition, certain, particularly extreme, market conditions can impinge upon the performance of market neutral strategies.

Buchan: For instance, in the 1987 market crash, many planned mergers fell apart as the shares of both would-be acquirers and targets fell in value. Market conditions thus affected—adversely—the performance of merger arbitrage strategies.

Jacobs: Long-Term Capital Management provides another example. This giant hedge fund was heavily involved in relative-value bond trades, having huge long positions in high-yield debt expected to rise in price and equally huge short positions in low-yield debt expected to fall in price. When Russia defaulted in the summer of 1998, however, investors worldwide were swept up in a flight to quality. Low-yield, "safe" securities, such as U.S. Treasury bills, soared in price, while the prices of higher-yielding debt that was perceived as riskier plummeted. LTCM lost billions, as did other hedge funds and proprietary trading desks that had similar positions.

Levy: Because of their short positions, however, market neutral portfolios can react to extreme market conditions in ways that might seem counterintuitive to traditional long-only investors. For example, the

1987 equity market crash, which pounded the values of most long-only portfolios, provided liquidity for market neutral equity portfolios. The short positions in these portfolios profited from the price drop, offsetting losses on the long positions. Furthermore, the funds they had deposited with brokers to cover the value of the shares they had borrowed to sell short were now worth far more than the shares were worth. The securities' lenders had to transfer excess cash collateral back to the market neutral accounts. Thus the liquidity of market neutral strategies can actually benefit from market crashes.

Buchan: Of course, any investment strategy is vulnerable to real-world challenges to the assumptions underlying it. The key is to anticipate such challenges and prepare for them.

If there's no market risk, where does the portfolio return come from?

Jacobs: A market neutral strategy is designed to be riskless in terms of its exposure to the relevant market benchmark. It retains the risks and returns associated with the individual securities constituting the portfolio. As these are both held long and sold short, their risks and returns will be offsetting to some degree. The return of the market neutral portfolio can be measured as the weighted return of the constituent securities or, in shorthand, as the spread between the long and short returns; portfolio risk can be measured as the standard deviation of these returns.

Buchan: The sources of risk, and return, will depend upon the particular strategy. For an option arbitrage strategy, risk and return are dependent upon changes in market volatility. A merger arbitrage strategy is exposed to the risk that a merger transaction will not be completed, as well as to the risk (shared by all investment strategies) that portfolio holdings will not perform as expected.

Can't neutrality be achieved by using futures, say, rather than by shorting securities?

Buchan: Yes, a manager could hold a long portfolio and short futures against it; as the underlying securities fall in value, the short futures position will rise in value (and vice versa), resulting in a return that is neutral to underlying market movements. This may be the best method for some specific market neutral strategies. For strategies that depend on security selection, however, the manager can generally enhance returns and gain greater control of risk by constructing a market neutral portfolio from long and short positions rather than achieving neutrality via a derivatives contract based on an underlying index.

Jacobs: This reflects the fact that long-only portfolios are generally constrained by the weights of the names in the underlying index, whereas market neutral long-short portfolios, if properly constructed, are free of index weights. This is most noticeable when you look at stock underweights. Given that the market capitalization for the median stock in the U.S. equity universe is 0.01% of the market's capitalization, a portfolio that cannot short can achieve, at most, a 0.01% underweight in the average stock; this underweight is obtained by excluding the stock from the portfolio. The manager may have a very negative view of the company, but the portfolio's ability to reflect that insight is extremely limited. The manager that can sell short, however, can underweight this stock by as much as investment insights (and risk considerations) dictate.

Levy: It's important to note that the market neutral long-short portfolio also has greater leeway to overweight stocks, because the manager can use offsetting long and short positions to control portfolio risk. Whereas a long-only portfolio may have to limit the size of the position it takes in any one stock or stock sector, in order to control the portfolio's risk relative to the underlying benchmark index, the market neutral long-short portfolio manager is not circumscribed by having to converge to benchmark weights to control risk. The freedom from benchmark constraints gives market neutral long-short portfolios greater leeway in the pursuit of return and control of risk—a benefit that translates into an advantage over market neutral portfolios constructed without shorting.

Can I "neutralize" my long-only portfolio by adding a short-only portfolio?

Buchan: Yes, but you would miss out on the real benefits of market neutral portfolio construction—the added flexibility to pursue returns and control risks that comes from the ability to offset the risk/return profiles of individual securities held long and sold short.

Levy: Integrated portfolio optimization results in a single market neutral portfolio, not a separate long portfolio plus a separate short portfolio.

But a long portfolio combined with a short portfolio would be market neutral?

Jacobs: Yes, but it would offer little advantage over a long-only portfolio that achieved neutrality via derivatives positions.

Wouldn't it benefit from the diversification provided by a less-than-one correlation between the returns on the long positions and the returns on the short positions?

Levy: But the same benefit can be achieved by adding to a long-only portfolio a less than perfectly correlated asset with similar risk and return. The unique advantages of market neutral long-short portfolios come only from an integrated optimization.

Will my portfolio be market neutral if I have equal amounts invested long and short?

Levy: Not unless the sensitivities of the positions held long and sold short are also equivalent. If the amounts invested are equal, but the betas are not, the portfolio will incur market risk (and returns). An investor might want to place a bet on the market's direction by holding larger and/or higher-beta positions long than short if the market is expected to rise, or vice versa if the market is expected to decline, but the portfolio in that case is not market neutral.

Buchan: It is also important to note that even a beta-neutral portfolio can retain residual exposures to certain market sectors. For example, long positions may overweight the technology sector, relative to the short positions, resulting in a portfolio that is exposed to systematic risk in this sector. A well-designed beta-neutral portfolio, however, will have such exposures only as the result of a deliberate choice on the part of the investor.

Jacobs: A similar problem arises in fixed-income market neutral. Market neutral fixed-income portfolios are generally designed to have matching durations for the longs and shorts; this means that, for a given parallel change in interest rates, price changes in the long and short positions will offset each other. If the term structure of interest rates does not change in a parallel fashion, however (for example, if long rates change less than short rates), price changes in the long and short positions will not be offsetting. It is thus important to determine the portfolio's expected responses to movements in each part of the yield curve (the short rate, the 10-year rate) and in each sector (corporates, mortgages, etc.).

Aren't short positions risky, or at least riskier than long positions?

Levy: It's true that the exposure of a long position is limited, because the security's price can go to zero but not below. Theoretically, a short position has unlimited exposure because the security's price can rise without bound. In practice, however, this risk is considerably mitigated. First, the short positions will be diversified across many securities. Second, a substantial (undesirable) increase in the price of a security that has been shorted will in all likelihood be at least partially offset by a (desirable) increase in the price of correlated securities held long. Third, because long and short positions must be kept roughly balanced to maintain neutrality, shorts are generally covered as they rise in price, limiting potential losses.

If you're using short positions to create a market neutral strategy, doesn't that mean the strategy must be leveraged?

Jacobs: Not necessarily. The amount of leverage of a given strategy is within the investor's control. Although Federal Reserve Board Regulation T permits leverage of up to two-to-one for equity strategies, for example, the investor can choose not to lever. Thus, given an initial \$100 in capital, the investor could invest \$50 long and sell short \$50; the amount at risk is then identical to that of a \$100 long-only investment.

Then wouldn't you want to avoid leverage in order to avoid the risk it entails?

Buchan: Actually, some leveraged market neutral strategies may be much less risky than unleveraged long-only strategies. For example, shorting a Treasury bond futures contract and owning the bond that is deliverable against the futures contract at expiration is a much less risky strategy than a long-only small-cap equity strategy. Furthermore, restricting the choice of market neutral strategies to those that are unleveraged can produce a "leverage paradox," whereby, in order to achieve a desired return, one may end up choosing an unleveraged strategy that is inherently riskier than a strategy that could be "levered up" to produce the same return at less risk.

Jacobs: In addition, by using all the strategies out there at the appropriate leverage levels (which for some may be no leverage), you can take advantage of the typically low correlations among all the strategies, rather than just a subset. This will produce the least risky portfolio of strategies, as you have the opportunity to diversify risks across many different markets.

Levy: Furthermore, long-only portfolios can use leverage, too. However, long-only strategies that borrow to leverage up returns expose the otherwise tax-free investor to a possible tax liability, as gains on borrowed funds are taxable as unrelated business taxable income. Borrowing stock to initiate short sales does not constitute debt financing, so profits resulting from closing out a short position do not give rise to unrelated business taxable income (UBTI).

Buchan: In general, when judging any market neutral strategy, the question should be whether the level of leverage is prudent with respect to the strategy. Clearly, if the strategy involves buying Asian technology stocks and shorting European financial stocks, there is a significant amount of risk (so much, in fact, that few investors would consider such a strategy market neutral). Conversely, if the strategy involves buying stock in a company and then shorting the same company's American Depositary Receipt (ADR) against the long position, the risk would be relatively small.

Jacobs: The same is true for fixed-income arbitrage: The level of prudent leverage is dependent upon the strategy. Buying Japanese government bonds and shorting European corporate securities is very risky; not only are the corporates inherently riskier (and less liquid), but you're arbitraging between two very different interest rate regimes. But buying U.S. Treasuries and selling short Eurodollar futures (buying a so-called TED spread), is not, as a trade, very risky.

Buchan: Basically, it's not the leverage per se that matters, but rather the leverage times the risk of the underlying position; or, more succinctly, it's the net exposure that matters.

So some market neutral strategies are riskier than others?

Buchan: Clearly, but this is true of investment strategies in general. With market neutral, the riskiness depends to a large extent on the underlying instruments. Mortgage securities, for example, are commonly perceived as quite a bit riskier than government bonds. Even here, however, it is difficult to generalize. Mortgage securities cover a wide range, from highly liquid pass-throughs to unique tranches of collateralized mortgage obligation (CMO) deals; therefore, it is misleading to lump all the different types of mortgage securities in the same group. Many mortgage securities are exposed to liquidity risk and prepayment risk (or, in more formal terms, exhibit negative convexity), and may be difficult to value. But some familiarity with these securities reveals that they are not that different from other types of bonds. Take the prepayment risk: as individuals prepay their mortgages, pass-through securities exhibit negative convexity; when interest rates fall, they increase in value by less than a similar fixed-rate government security and, conversely, when interest rates rise, they fall by more than the similar government security. But the investor is compensated for these adverse outcomes with a higher yield. Thus, the salient question for the pass-through investor is whether the yield on the security *adequately* compensates for the adverse price risk.

Levy: This is essentially no different from ordinary government bonds. Zero-coupon bonds, for example, have lots of positive convexity, on a relative basis, and will therefore often yield less than coupon bonds. There are also liquidity and valuation issues, just as with corporate bonds. Most corporate bonds are illiquid, in the sense that it can cost a lot to trade them. By this measure, many mortgage securities are actually more liquid than corporates. In addition, in valuing a corporate bond, one has to estimate the probability of default and the corresponding likely recovery rates—just as one has to estimate future mortgage prepayment rates under differing economic scenarios.

Buchan: So mortgage securities are different from but, in general, not necessarily riskier than other bonds used in market neutral strategies.

Jacobs: Ken's comment about the liquidity of corporates reminds me that one should also take into account, when evaluating the risk of a particular strategy, the liquidity of the underlying markets, which may be of critical importance especially for highly leveraged strategies. And another concern I might add is the availability of opportunities in a particular strategy; to the extent that this may limit the ability to diversify one's portfolio, it can have a considerable impact on risk.

Aren't market neutral strategies best exploited only in certain situations or by investors with special information?

Jacobs: I've heard it said that market neutral equity strategies only make sense if pricing inefficiencies are larger or more frequent for potential short positions (that is, among stocks that tend to be overpriced) than for potential long positions (stocks that tend to be underpriced). But greater inefficiency of short positions is not a necessary condition for market neutral investing to offer benefits compared with long-only investing. These benefits reflect the added leeway to pursue return and the greater control of risk that derive from the strategy's freedom from benchmark weight constraints.

Levy: It's also frequently heard that merger arbitrage does not work unless it's based on insider information. But, as it is practiced in the institutional investment community, merger arbitrage is usually based on a public announcement, where the identity of the target, the identity of the buyer, and the rough terms of the transaction are disclosed. Even after such an announcement is made, a spread between the acquirer and the target tends to persist until the deal closes. This spread reflects the very real risks that the deal will not close or, if it does close, it will take a lot longer than expected, reducing the investor's annualized return. Managers able to analyze these risks correctly have been able to use merger arbitrage to add significant value on a risk-adjusted basis over the past decade.

Buchan: A lot of people think convertible bond hedging follows a four-year cycle in terms of returns. Historically, the strategy has underperformed for a quarter or two every three to four years, in 1987, 1990, 1994, 1998, and 2002, and then proceeded to enjoy a strong recovery in the ensuing year. But what's behind this pattern? Some of the returns to convertible bond hedging may come from a liquidity premium the convertible holder collects in return for holding a relatively illiquid security. If this is the case, then we should see convertible bond hedgers underperforming when liquidity is prized, as these less liquid assets get marked down. In fact, regressing the return of convertible hedgers as a universe on a liquidity measure (such as the spread between Treasury bills and LIBOR) shows that, when the most liquid instruments are highly valued, convertible bond hedging does poorly for the quarter (typically down 2% to 7%). So the question is not whether convertible bond hedging has an inherent four-year cycle but, rather, what makes highly liquid instruments more valuable every four years?

But won't market neutral long-short positions be riskier in general than the positions taken by an index-constrained long-only portfolio?

Jacobs: Although a market neutral long-short portfolio may be able to take larger long (and short) positions in securities with higher (and lower) expected returns compared with a long-only index-constrained portfolio, proper integrated optimization will provide for selections and weightings made with a view to maximizing expected return at the risk level desired by the investor.

But surely trading costs will be higher?

Levy: The trading costs will largely be a reflection of the leverage in the portfolio. If a market neutral equity portfolio takes advantage of the full two-to-one leverage allowed, for example, it will engage in roughly twice as much trading as a comparable long-only portfolio with the same capital and no leverage. As in any investment strategy, however, it is important in market neutral to estimate expected returns net of trading costs. A market neutral portfolio should not trade unless those trades offer a return above and beyond the cost of trading.

But surely management fees will be higher for market neutral than for long-only strategies?

Jacobs: If one considers management fees per dollar of securities positions, rather than per dollar of capital, there is not much difference between market neutral and long-only. And management fees per *active* dollar managed may be lower with market neutral than with long-only. Index-constrained long-only portfolios contain a substantial "hidden passive" element; as their active positions consist of only those portions of the portfolio that represent overweights or underweights relative to the benchmark, a large portion of the portfolio is essentially passive index weights. This is not true of market neutral. Because a market neutral portfolio is independent of benchmark weights, its positions can be fully devoted to performance (i.e., to either enhancing return or reducing risk).

Levy: Also, most market neutral strategies are managed on a performance-fee basis, so the fee will reflect the manager's value-added.

Should one use a single manager or multiple managers for a market neutral strategy?

Jacobs: Some investors choose to create a market neutral strategy by combining a long-only portfolio with a short-only portfolio or with a derivatives position that neutralizes the long portfolio's market risk. In these cases, the manager of the long portfolio may differ from the manager of the short portfolio or from the overlay manager that looks after the derivatives positions. As we have noted, however, these types of market neutral strategies cannot benefit from the full flexibility afforded by long-short portfolio construction. This goes back to our previous comments on integrated optimization: Only an integrated optimization, which considers long and short positions simultaneously, results in a portfolio that is free of benchmark weight constraints, hence able to exploit fully the risk-reducing and return-enhancing benefits of market neutral construction using long and short positions. An investor seeking these benefits from a market neutral strategy should have it managed under a single roof.

Buchan: But the same may not hold if you are considering multiple market neutral strategies. In general, the value-addeds are much less correlated across market neutral managers than across long-only equity managers. The reason is there are many more styles of market neutral investing (over 20) than there are of equity investing (growth vs. value, large cap vs. small cap). As long as the managers have the same expected return, one can lower the risk of an overall fund more by using many market neutral managers than by using many long-only equity managers.

Is market neutral too complicated for most investors to understand?

Buchan: There are two parts to market neutral investing—the strategy and the securities. As I have noted, the strategy itself is typically no more complex than what is being done on a long-only basis, with regard to benchmark-relative investing. There, the issue is how the portfolio will perform relative to the benchmark; here, the issue is how one security (or basket of securities) will perform relative to another. The other issue is the type of securities used to implement the market neutral strategy. Clearly, there are securities that are simple to evaluate and securities that are more complex. But this is independent of whether or not they are being used in a market neutral strategy.

How will it fit into a plan's overall structure?

Jacobs: First, it is important to understand that market neutral does not constitute a separate asset class. The asset class to which a market neutral portfolio belongs depends upon how the portfolio is constructed. A market neutral portfolio is essentially a cash investment (albeit with higher volatility than cash); its value-added is the portfolio's return relative to the interest receipts from the short sale proceeds. But one can combine a market neutral portfolio with various derivatives positions to obtain exposures to any number of assets—equity, bonds, currency. For example, a position in stock index futures combined with a market neutral portfolio results in an "equitized" portfolio; its value-added is the portfolio's return relative to the equity index return from the futures position.

Levy: Plan sponsors can take advantage of this flexibility to simplify a plan's structure. Using market neutral, they can exploit superior security selection skills (whether in the bond market, the stock market, or the currency market), while determining the plan's asset allocation mix separately, via the choice of derivatives. In this sense, market neutral can be said to simplify a plan sponsor's decision-making.

CHAPTER 3

Market Neutral Equity Investing

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

In market neutral equity investing, the investor buys "winners"—securities that are expected to do well over the investment horizon—and sells short "losers"—securities that are expected to perform poorly. Unlike traditional equity investing, market neutral investing takes full advantage of the investor's insights: whereas the traditional investor would act and potentially benefit only from insights about winning securities, the market neutral investor can act on and potentially benefit from insights about winners and losers.

To achieve market neutrality, the investor holds approximately equal dollar amounts of long and short positions. Furthermore, the securities are selected with careful attention to their systematic risks. The long positions' price sensitivities to broad market movements should virtually offset the short positions' sensitivities, leaving the overall portfolio with negligible systematic risk.

This means that the portfolio's value does not rise or fall just because the broad market rises or falls. The portfolio may thus be said to have a beta of zero. This does not mean that the portfolio is risk-free. It will retain the risks associated with the selection of the stocks held long and sold short. The value-added provided by insightful security selection, however, should more than compensate for the risk incurred.

MECHANICS

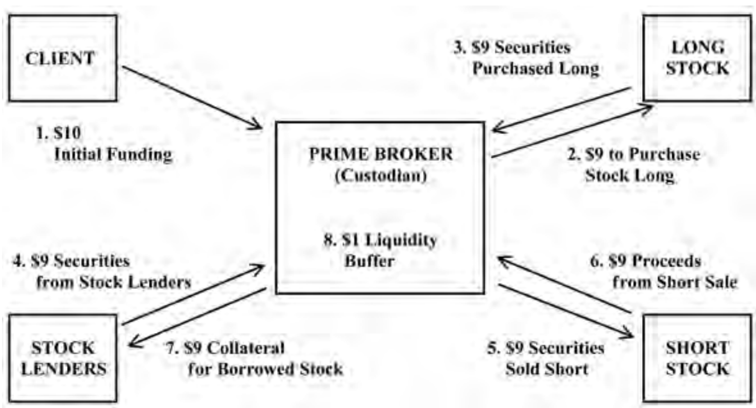
Exhibit 3.1 illustrates the operations needed to establish a market neutral equity strategy, assuming a $10 million initial investment. Keep in mind that these operations are undertaken virtually simultaneously, although they will be discussed in steps.

The Federal Reserve Board requires that short positions be housed in a margin account at a brokerage firm. The first step in setting up a long-short portfolio, then, is to find a "prime broker" to administer the account. This prime broker clears all trades and arranges to borrow the shares to be sold short.

Exhibit 3.1 shows that, of the initial $10 million investment, $9 million is used to purchase the desired long positions. These are held at the prime broker, where they serve as the collateral necessary, under Federal Reserve Board margin requirements, to establish the desired short positions. The prime broker arranges to borrow the securities to be sold short. Their sale results in cash proceeds, which are delivered to the stock lenders as collateral for the borrowed shares.[1]

Federal Reserve Board Regulation T ("Reg T") requires that a margined equity account be at least 50% collateralized to initiate short sales.[2] This means that the investor could buy $10 million of securities and sell short another $10 million, resulting in $20 million in equity positions, long and short. As Exhibit 3.1 shows, however, the investor has bought only $9 million of securities, and sold short an equal amount. The account retains $1 million of the initial investment in cash.

EXHIBIT 3.1 **Market Neutral Deployment of Capital (Millions of Dollars)**



Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

This "liquidity buffer" serves as a pool to meet cash demands on the account. For instance, the account's short positions are marked to market daily. If the prices of the shorted stocks increase, the account must post additional capital with the stock lenders to maintain full collateralization; conversely, if the shorted positions fall in price, the (now overcollateralized) lenders release funds to the long-short account. The liquidity buffer may also be used to reimburse the stock lenders for dividends owed on the shares sold short, although dividends received on stocks held long may be able to meet this cash need. In general, a liquidity buffer equal to 10% of the initial investment is sufficient.

The liquidity buffer will earn interest for the market neutral account. We assume the interest earned approximates the Treasury bill rate. The $9 million in cash proceeds from the short sales, posted as collateral with the stock lenders, also earns interest. The interest earned is typically allocated among the lenders, the prime broker, and the market neutral account; the lenders retain a small portion as a lending fee, the prime broker retains a portion to cover expenses and provide some profit, and the long-short account receives the rest. The exact distribution is a matter for negotiation, but we assume the amount rebated to the investor (the "short rebate") approximates the Treasury bill rate.[3]

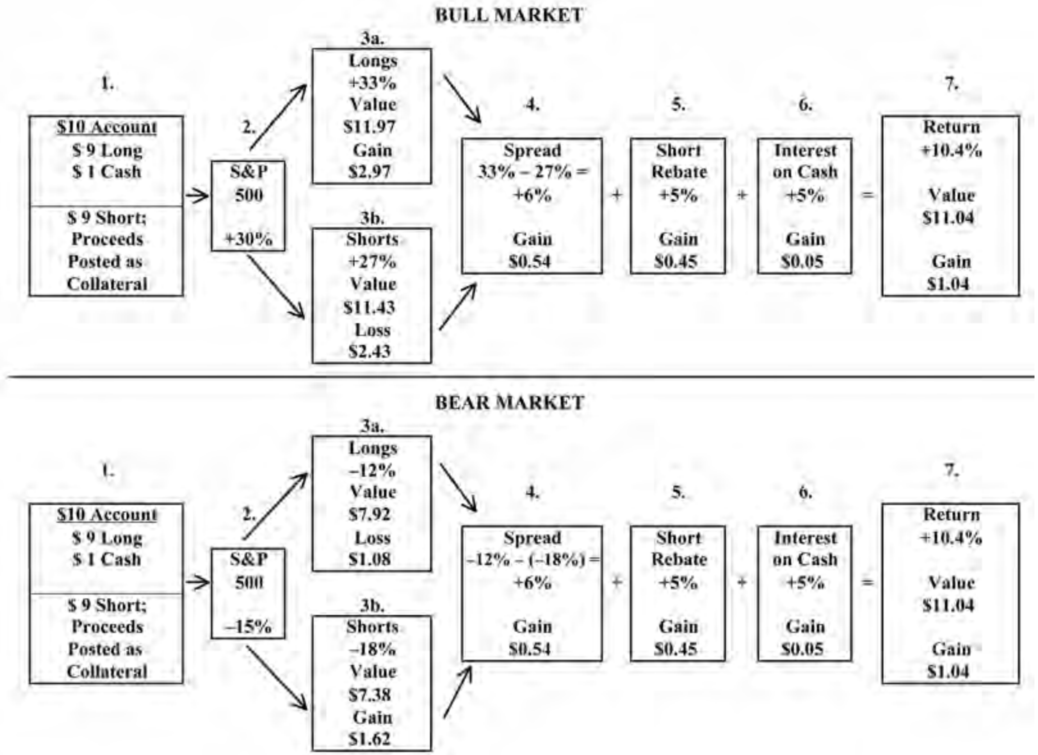
The overall return to the market neutral equity portfolio thus has two components: an interest component and an equity component. The performances of the stocks held long and sold short will determine the equity component. As we will see below, this component will be independent of the performance of the equity market from which the stocks have been selected.

Market Neutrality

The top half of Exhibit 3.2 illustrates the performance of a market neutral equity portfolio. It assumes the market rises by 30%, while the long positions rise by 33% and the short positions by 27%. The 33% return increases the value of the $9 million in long positions to $11.97 million, for a $2.97 million gain. The 27% return on the shares sold short increases their value from $9 million to $11.43 million; as the shares are sold short, this translates into a $2.43 million loss for the portfolio.

The net gain from equity positions equals $540,000, or $2.97 million minus $2.43 million. This represents a 6.0% return on the initial equity investment of $9 million, equal to the spread between the returns on the long and short positions (33% minus 27%). As the initial equity investment represented only 90% of the invested capital, however, the equity component's performance translates into a 5.4% return on the initial investment (90% of 6.0%). (Of course, if the shorts had outperformed the longs, the return from the equity portion of the portfolio would be negative.)

EXHIBIT 3.2 Hypothetical Performance in Bull and Bear Markets (millions of dollars)



Source: Bruce I. Jacobs and Kenneth N. Levy, “The Long and Short on Long-Short,” *Journal of Investing* (Spring 1997).

We assume the short rebate (the interest received on the cash proceeds from the short sales) equals 5%. This amounts to $450,000 (5.0% of $9 million). The interest earned on the liquidity buffer adds another $50,000 (5.0% of $1 million). (A lower rate would result, of course, in a lower return.) Thus, at the end of the period, the $10 million initial investment has grown to $11.04 million. The long-short portfolio return of 10.4% comprises a 5% return from interest earnings and a 5.4% return from the equity positions, long and short.

The bottom half of Exhibit 3.2 illustrates the portfolio's performance assuming the market declines by 15%. The long and short positions exhibit the same market-relative performances as above, with the longs falling by 12% and the shorts falling by 18%. In this case, the decline in the prices of the securities held long results in an ending value of $7.92 million, for a loss of $1.08 million. The shares sold short, however, decline in value to $7.38 million, so the portfolio gains $1.62 million from the short positions. The equity positions thus post a gain of $540,000—exactly the same as the net equity result experienced in the up-market case. The interest earnings from the short rebate and the liquidity buffer are the same as when the market rose, so the overall portfolio again grows from $10 million to $11.04 million, for a return of 10.4%. (Obviously, if the shorts had fallen less than the longs, or interest rates had declined, the return would be lower.)

A market neutral equity portfolio is designed to return the same amount whether the equity market rises or falls. A properly constructed market neutral portfolio, if it performs as expected, will incur virtually no systematic, or market, risk; its return will equal its interest earnings plus the net return on (or the spread between) the long and short positions. The equity return spread is purely active, reflecting the investor's stock selection skills; this return spread is not diluted (or augmented) by the underlying market's return.

ADVANTAGES OF MARKET NEUTRALITY AND SHORT SELLING

Exhibit 3.2 highlights one obvious benefit of a market neutral equity approach—elimination of market risk. In a market neutral portfolio, the returns to active investing are no longer hostage to the sometimes overwhelming effects of broad market moves. Of course, this freedom comes at a price: The market neutral portfolio also does not benefit from the positive return that equity, as an asset class, has historically enjoyed (although, as we will see in Chapter 8, the investor can recapture this equity risk premium by using derivatives).

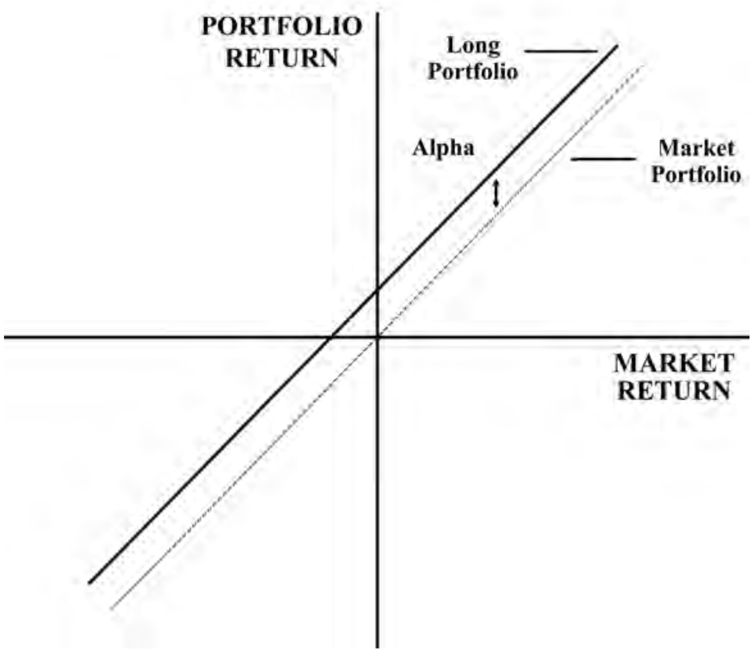
Another obvious advantage of a market neutral approach to equity investing is that it allows the investor to exploit insights about poor performers as well as good performers. Long positions in stocks that are undervalued and short positions in stocks that are overvalued make use of all available market information to enhance returns. Not being able to use insights about overvalued as well as undervalued stocks is like tearing the *Wall Street Journal* in half and reading only the good news.

Some of the return advantages of a market neutral equity strategy can be illustrated by comparing the return payoffs of a very basic long-plus-short portfolio with those of a long-only portfolio.[4]

Exhibit 3.3 shows the payoffs to a long-only portfolio. The line for the market portfolio can be viewed as the return to a long passive position in the market. The benefit of active management is presumably an excess return, or alpha. This excess return shifts the active long portfolio's payoff upward relative to the long market portfolio.

Exhibit 3.4 shows the payoffs to the short portfolio. The short market portfolio can be viewed as the return to a short passive position in the

EXHIBIT 3.3 **Payoffs to a Long Portfolio**



Source: Bruce I. Jacobs and Kenneth N. Levy, "Long/Short Equity Investing," *Journal of Portfolio Management* (Fall 1993).

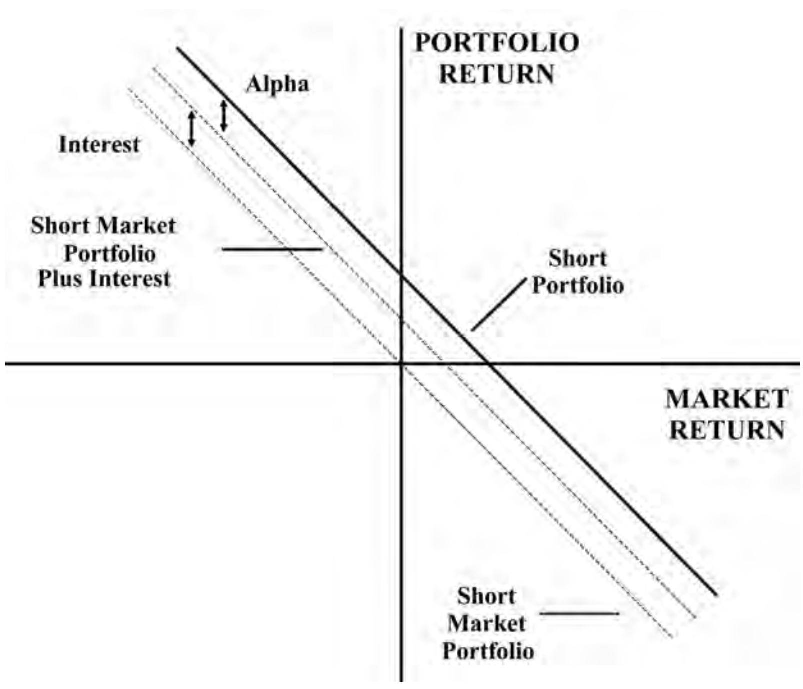
market. When an investor sells short, however, proceeds are generated, and those proceeds earn interest. The short market portfolio line can thus be shifted upward by the amount of interest, as shown in the figure. Active management should produce an excess return, or alpha, on top of the market-return-plus-interest line. The payoff line for the active short portfolio thus recognizes the short passive market return, the interest received on the short-sale proceeds, and the excess return due to active management.

A long-plus-short portfolio combines the long portfolio and the short portfolio discussed above. Exhibit 3.5 shows that the payoff for this long-plus-short portfolio equals the alpha from the short portfolio plus the alpha from the long portfolio plus the interest earned on the proceeds from the short sales.

A Question of Efficiency

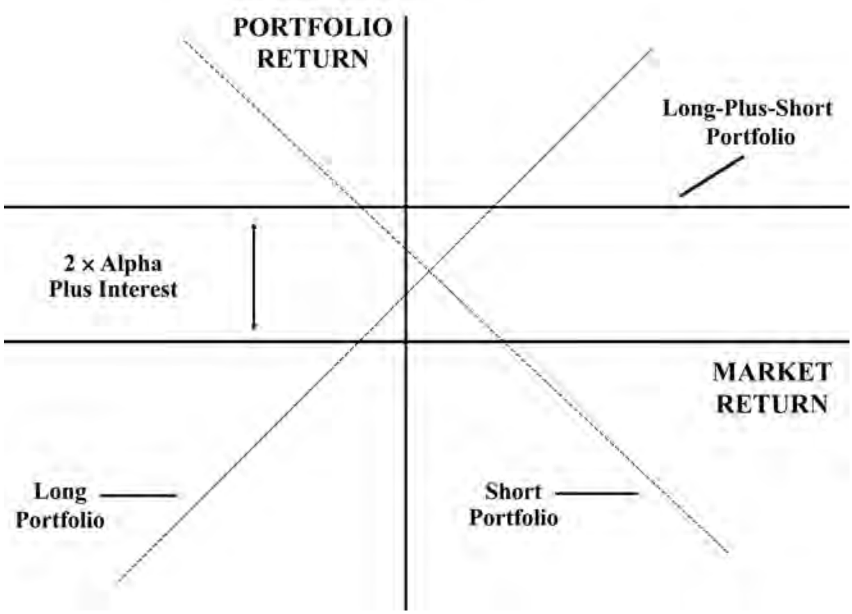
Exhibits 3.2 and 3.5 assume symmetric market-relative returns for the long and short positions; that is, the long positions and the short posi-

EXHIBIT 3.4 **Payoffs to a Short Portfolio**



Source: Bruce I. Jacobs and Kenneth N. Levy, "Long/Short Equity Investing," *Journal of Portfolio Management* (Fall 1993).

EXHIBIT 3.5 Payoffs to a Long-Plus-Short Portfolio



Source: Bruce I. Jacobs and Kenneth N. Levy, "Long/Short Equity Investing," *Journal of Portfolio Management* (Fall 1993).

tions are assumed to have the same absolute market-relative return. However, there are reasons to believe that short-sale candidates—the most overpriced stocks, which offer the lowest expected returns—may be more common or more mispriced than the underpriced stocks that constitute the candidates for purchase. In that case, one might expect higher excess returns from short positions than from long positions.

Exhibit 3.6 describes a world divided according to whether short selling is restricted or unrestricted and whether investor opinion is uniform or diverse. When investor opinion is diverse and short selling is restricted, the market portfolio is no longer efficient.[5] If investors have diverse opinions, some will be more optimistic and others more pessimistic; if the pessimistic investors face more obstacles in selling short than the optimistic investors face in purchasing long, optimism in pricing will tend to prevail.[6]

Investor optimism is supported by several institutional features of the stock market. Corporations, for example, are generally eager to publicize good news, but they may delay releasing bad news or attempt to disguise it via window-dressing or, at times, actual fraud. Stock prices may thus reflect good news more quickly and unambiguously than bad news.

EXHIBIT 3.6 Impact of Divergence of Opinion and Restricted Shorting on Market Equilibrium

		INVESTOR OPINION	
		Uniform	Diverse
SHORT SELLING	Unrestricted	Market Portfolio Efficient CAPM & APT Hold (no one shorts)	Market Portfolio Efficient CAPM & APT Hold
	Restricted	Market Portfolio Efficient CAPM & APT Hold	Market Portfolio Not Efficient CAPM & APT Do Not Hold

Source: Bruce I. Jacobs and Kenneth N. Levy, "Long/Short Equity Investing," *Journal of Portfolio Management* (Fall 1993).

Practices at brokerage firms, too, favor optimism in security pricing. Attention has lately focused, for example, on whether analysts' recommendations are swayed by their firms' investment banking interests; in cases where analyst compensation depends in some measure on the profitability of investment banking, analysts may feel pressured to put a positive spin on analyses of companies that are existing or potential investment banking clients. Positive recommendations may also be expected to result in more profits from brokerage than negative recommendations; all customers are potential purchasers, whereas commissions from sales will come primarily from customers who already own the stock.

These features of the securities business may combine with aspects of investor psychology to create stock bubbles and fads, in which rising prices become detached from any rational estimate of "fair" value. Recent history gives us the example of the tech stock bubble of 1999–2000, in which momentum investors bid up to extraordinary levels the prices of some companies with highly volatile and even negative earnings.[7] As that example showed, investor optimism can result in substantial departures of prices from underlying fundamental values, and these departures can last for nontrivial periods.

Theoretically, as shares become overpriced, given underlying fundamentals, "rational" investors, including value investors, might be expected to sell these overpriced shares short, reducing the upward pressure on prices. Their ability, or willingness, to do so may be limited, however, for several reasons.

The ability to sell short is generally more restricted than the ability to buy long. Short selling may be legally or contractually forbidden or constrained. Even investors not so constrained may nevertheless face obstacles to short selling. For instance, sometimes shares may not be readily available for borrowing. And at some times, the investor will not be able to sell short because of exchange uptick rules, which forbid short sales when share price is falling.

Willingness is another factor. Even if rational investors are sure that securities are overpriced (or underpriced, for that matter), they are not likely to be willing to take unlimited offsetting positions, because they cannot be sure that prices won't continue to move against them. Investors who sold short tech stocks in early 1999, for example, ended up taking on considerable risk, as the tech bubble kept inflating for months. These investors suffered mounting losses on short positions until the bubble burst in the spring of 2000. Furthermore, many may not have been able or willing to hang on to enjoy a reversal in fortune, as they faced increasing demands for collateral to cover the rise in the prices of their short positions. Thus considerations of risk and liquidity may limit investors' willingness (and ability) to sell short in sufficient magnitude to offset overpricing at all times.

Short sales have historically accounted for a small, though rising, percentage of shares outstanding. Short interest on the New York Stock Exchange, about 0.2% two decades ago, is now about 1.6%. Of course, only a portion of this interest is motivated by security selection; most short sales are undertaken by dealers supplying liquidity or investors shorting for risk-hedging, tax-deferral, or arbitrage purposes.

In a market characterized by diverse opinion and restricted short selling, then, inefficiencies might be concentrated in overpriced stocks. In that case, short sales of the most overpriced stocks may be able to offer higher excess returns than long purchases of underpriced stocks. When market inefficiency is greater on the short side of the market than the long side, the excess return to the short portfolio in Exhibit 3.4 may be expected to be greater than the excess return to the long portfolio in Exhibit 3.3, and the returns to the long and short positions illustrated in Exhibit 3.2 will not be symmetric about the market return, but will be greater for short positions.

INTEGRATED OPTIMIZATION

The ability to sell short constitutes a material advantage for a market neutral investor compared with a long-only investor. Consider, for example, a long-only investor who has an extremely negative view about a typical stock. The investor's ability to benefit from this insight is very limited. The most the investor can do is exclude the stock from the portfolio, in which case the portfolio will have about a 0.01% underweight in the stock, relative to the underlying market (as the median-capitalization stock in the Russell 3000 universe has a weighting of 0.01%). Those who do not consider this to be a material constraint should consider what its effect would be on the investor's ability to overweight a typical stock. It would mean the investor could hold no more than a 0.02% long position in the stock—a 0.01% overweight—no matter how attractive its expected return.

The ability to short, by increasing the investor's leeway to act on his or her insights, has the potential to enhance returns from active security selection. This potential may be especially appealing if, as the discussion above has suggested, short-sale candidates are less efficiently priced than purchase candidates. Even if this is not the case, however—if overpriced securities are no more inefficient than underpriced securities—market neutral construction can improve upon the results of long-only portfolio management.

The scope of the improvement offered by market neutral investing depends critically on the way in which the portfolio is constructed. In particular, an integrated optimization that considers both long and short positions simultaneously frees the investor not only from the non-negativity constraint imposed on long-only portfolios, but also frees the market neutral portfolio from the restrictions imposed by securities' benchmark weights. To see this, it is useful to examine in some detail the ways in which market neutral portfolios can be constructed, and their implications for portfolio performance.

For instance, many investors construct market neutral portfolios by combining a long-only portfolio, perhaps a preexisting one, with a short-only portfolio. This results in a long-plus-short portfolio similar to the one illustrated in Exhibit 3.5. The long side of this portfolio is identical to a long-only portfolio, hence it offers no benefits in terms of incremental return or reduced risk. Furthermore (assuming no greater inefficiencies on the short side), the short side of this portfolio is statistically equivalent to the long side, hence to the long-only portfolio. In effect:

$$\alpha_L = \alpha_S = \alpha_{LO}$$

$$\omega_L = \omega_S = \omega_{LO}$$

The excess return or alpha, α_L, of the long side of the long-plus-short portfolio will equal the alpha of the short side, α_S, which will equal the alpha of the long-only portfolio, α_{LO}. Furthermore, the residual risk of the long side of the long-plus-short portfolio, ω_L, will equal the residual risk of the short side, ω_S, which will equal the residual risk of the long-only portfolio, ω_{LO}.

These equivalencies reflect the fact that all the portfolios, the long-only portfolio and the long and short components of the long-plus-short portfolio, are constructed relative to a benchmark index. Each portfolio is active in pursuing excess return relative to the underlying benchmark only insofar as it holds securities in weights that depart from their benchmark weights. However, departures from benchmark weights introduce residual risk. Controlling portfolio risk thus involves balancing expected excess (to benchmark) returns against the added risk they introduce. In this balancing act, the investor faces the probability of having to forgo some increment of expected return in order to reduce portfolio residual risk. Portfolio construction is benchmark-constrained.[8]

Consider, for example, an investor who does not have the ability to discriminate between good and bad oil stocks, or who believes that no oil stock will significantly out- or underperform the underlying benchmark in the near future. In long-plus-short, this investor may have to hold some oil stocks in the long portfolio and short some oil stocks in the short portfolio, if only to control each portfolio's residual risk relative to the benchmark.

In long-plus-short, the advantage offered by the flexibility to short is also curtailed by the need to control risk by holding or shorting securities in benchmark-like weights. The ratio of the performance of the long-plus-short portfolio to that of the long-only portfolio can be expressed as follows:

$$\frac{IR_{L+S}}{IR_{LO}} = \sqrt{\frac{2}{1 + \rho_{L+S}}}$$

where IR is the information ratio, or the ratio of excess return to residual risk, α/ω, and ρ_{L+S} is the correlation between the alphas of the long and short sides of the long-plus-short portfolio. If this correlation is less than one, the long-plus-short portfolio will enjoy greater diversification and reduced risk relative to a long-only portfolio, for an improvement in IR. However, a long-only portfolio can derive a similar benefit by adding a less than fully correlated asset with comparable risk and return, so this is not a benefit unique to long-short.[9]

The Real Benefits of Market Neutral

The real benefits of market neutral emerge only when the portfolio is conceived of and constructed as a single integrated portfolio of long and short positions.[10] In this framework, market neutral is not a two-portfolio strategy. It is a one-portfolio strategy in which the long and short positions are determined jointly within an optimization that takes into account the expected returns of the individual securities, the standard deviations of those returns, and the correlations between them, as well as the investor's tolerance for risk.

With integrated optimization, a market neutral portfolio is not constrained by benchmark weights. Once an underlying benchmark has been used to determine the systematic risks of the candidate securities, its role in market neutral construction is effectively over. The offsetting market sensitivities of the aggregate long and aggregate short positions eliminate market sensitivity and the need to consider benchmark weights in establishing security positions. The investor is not constrained to moving away from or toward benchmark weights in order to pursue return or control risk. Rather, capital can be allocated without regard to the securities' weights in the underlying benchmark, as offsetting long and short positions are used to control portfolio risk. To establish a 1% overweight or a 1% underweight, the investor merely has to allocate 1% of capital long or allocate 1% of capital short.

Suppose, for example, that an investor's strongest insights are about oil stocks, some of which are expected to do especially well and some especially poorly. The investor does not have to restrict the portfolio's holdings of oil stocks to benchmark-like weights in order to control the portfolio's exposure to oil sector risk. The investor can allocate much of the portfolio to oil stocks, held long and sold short. The offsetting long and short positions control the portfolio's exposure to the oil factor.

Conversely, suppose the investor has no insights into oil stock behavior. Unlike the long-only and long-plus-short investors discussed above, the integrated market neutral investor can totally exclude oil stocks from the portfolio. The exclusion of oil stocks does not increase portfolio risk, because the integrated market neutral portfolio's risk is independent of any security's benchmark weight. At the same time, freed of the need to hold deadweight in the form of securities that offer no abnormal expected returns, the investor can allocate more capital to securities that do offer expected abnormal returns.

In an integrated optimization, selection of the securities to be held long is determined simultaneously with the selection of the securities to be sold short. The result is a single market neutral portfolio, not one long portfolio and one short portfolio. Just as one cannot attribute the qualities of water, its wetness say, to its hydrogen or oxygen components separately, one cannot reasonably dissect the performance of an integrated market neutral portfolio into one element attributable to long positions alone and another attributable to short positions alone. Only jointly do the long and short positions define the portfolio. Long and short excess returns, or alphas, are thus meaningless concepts.

Rather than being measurable as long and short performance in excess of an underlying benchmark, the performance of the equity portion of the integrated market neutral portfolio is measurable as the overall return on the long and short positions—or the spread between the long and short returns—relative to their risk. Compared with the excess return/residual risk of long-only management, this performance should be enhanced by the elimination of benchmark constraints, which allows the market neutral portfolio increased flexibility to implement investment insights, both long and short.

OPERATIONAL CONSIDERATIONS

Market neutral construction maximizes the benefit obtained from potentially valuable investment insights by eliminating long-only investing's constraint on short selling and the need to converge to securities' benchmark weights in order to control portfolio risk. While market neutral offers advantages over long-only, however, it also involves complications not encountered in long-only management. Many of these complications are related to the unique trading requirements of market neutral and to its use of short selling.

Trading Market Neutral Portfolios

The trading of market neutral equity portfolios is more complicated than that of long-only portfolios. First, the values and market sensitivities of the aggregate long and aggregate short positions must be kept in balance on a real-time basis in order to provide market neutrality. Second, the account must meet Federal Reserve, stock exchange, and individual broker initial and maintenance margin requirements. Third, marks to market on short positions must be satisfied.

Ensuring that overall portfolio neutrality is maintained throughout a trading program may require that long or short trades be sped up or slowed down relative to their occurrence in a typical long-only portfolio. Because short sales are more problematic and more likely to experience delays (as the result of uptick trading restrictions), imbalances may occur. In that event, securities may have to be sold long or shorts covered until balance is restored. Derivatives may also be used to correct temporary imbalances.

Various margin requirements govern a market neutral portfolio at its establishment and throughout its life. As noted earlier, under Federal Reserve Board Regulation T, establishment of an equity short position requires at least 50% margin. Once established, short positions are subject to less stringent maintenance margins, set by the exchanges or individual brokers. NYSE Rule 431 sets maintenance margins at 25% of the stock price for long positions, at the greater of $5 or 30% of stock price for short positions when the stock is more than $5 a share, and at the greater of $2.50 or the stock price for short positions when the stock is less than $5 a share. Individual brokers generally require more than 30% collateralization.

An account that falls below maintenance margin requirements will have to decrease its securities exposure by covering shorts or selling longs or to increase its capital by adding cash. An account that meets maintenance margin requirements but not the initial margin requirement is restricted in the sense that it can make no transactions that would cause further reduction in margin, such as shorting or purchasing additional shares on margin or withdrawing cash.

Short positions are marked to market daily. Increases in a stock's price will require that the short seller deposit additional collateral with the stock lenders. Declines will release collateral from the stock lenders to the short seller's margin account. The liquidity buffer serves as a cash pool for meeting and receiving these obligations. It may also be used to reimburse stock lenders for any dividends paid on the short positions. In most cases, these payments can be met from the dividends on the long positions. When the dividend yield on the longs is less than that on the shorts, however, the liquidity buffer may be pressed into service.

Determination of the size of the liquidity buffer is a balancing act. Investors will want to be able to invest as much capital as possible, hence have the smallest liquidity buffer practical. At the same time, they will want to avoid having to borrow from the broker in order to meet required payments. Borrowing at the broker call rate can be costly and may have tax repercussions for a tax-exempt investor. A liquidity buffer equal to 10% of capital generally provides a reasonable tradeoff between these competing goals.

Exhibits 3.7 and 3.8 illustrate how maintenance of long-short balance, margin requirements, and marks to market can require portfolio trading. Exhibit 3.7 shows the effects on a $10 million market neutral portfolio when both long and short positions either fall in value by 50% or rise in value by 100%. At the outset, the market neutral portfolio easily meets initial margin requirements, as long and short positions totaling $18 million ($9 million long plus $9 million short) are collateralized by $10

EXHIBIT 3.7 Trading Required When Long and Short Positions Fall 50% or Rise 100% (millions of dollars)

	Initial Values	Return		Gain/Loss		Owe/Owed		New Values		Action		After-Action Values
	Fall or Rise	Fall	Rise	Fall	Rise	Fall	Rise	Fall	Rise	Fall	Rise	Fall or Rise
Long	$9	–50%	+100%	–$4.5	+$9			$4.5	$18	Buy $4.5	Sell $9	$9
Short	$9	–50%	+100%	+$4.5	–$9	Owed $4.5 by Lenders	Owe Lenders $9	$4.5	$18	Sell Short $4.5	Cover $9	$9
Cash	$1							$5.5	–$8			$1
Equity	$10							$10	$10			$10
Margin	55.6%							111.1%	27.8%			55.6%

Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

EXHIBIT 3.8 2% Long-Short Spread (millions of dollars)

	Initial Values	Return	Gain/Loss	Owe/Owed	New Values	Action	After-Action Values
Long	$9	+4%	+$0.36		$9.36	Sell $0.198	$9.162
Short	$9	+2%	–$0.18	Owe Lenders $0.18	$9.18	Cover $0.018	$9.162
Cash	$1				$0.82		$1.018
Equity	$10				$10.18		$10.18
Margin	55.6%				54.9%		55.6%

Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

million in equity (the longs plus the cash in the liquidity buffer), for a margin of 55.6%.

A 50% decline in the values of the longs and shorts results in the securities' lenders being overcollateralized; they will have to transfer $4.5 million to the market neutral account. The liquidity buffer will then be larger than needed. The investor can buy an additional $4.5 million in securities and sell short an additional $4.5 million, restoring the account to its initial values.

A 100% increase in the values of the longs and shorts results, by contrast, in the securities' lenders being undercollateralized; they hold only $9 million in cash proceeds from the initial short sales, but the securities they lent are now worth $18. The long-short account must transfer an additional $9 million to the stock lenders. Taking this sum from the liquidity buffer, however, would result in a deficit of $8 million and leave the overall portfolio undermargined, by brokers' standards, at 27.8%. In order to meet the marks to market on the short positions and reestablish maintenance margin, the investor can sell $9 million worth of securities held long and cover $9 million worth of securities sold short. This will restore the portfolio to its initial starting values.

The behavior of the long and short values in Exhibit 3.7 is consistent with the effects of underlying market movements; that is, the equivalent systematic risks of the long and short positions would lead to equivalent value changes in the absence of residual, or nonsystematic, risk. We can thus infer that, even though the return on a basic market neutral equity portfolio is neutral to overall equity market movements, market movements can have implications for the implementation of market neutral strategies; in particular, they may necessitate trading activity.

In practice, of course, one is unlikely to experience market movements of the magnitudes illustrated. More likely movements would lead to fewer violations of margin requirements and less trading. With a 5% market rise, for example, the initial long and short positions in Exhibit 3.7 could be expected to increase to $9.45 million, calling for a payment of $0.45 million to the securities' lenders and a reduction in the liquidity buffer to $0.55 million. There would be no violation of margin (margin would be 52.9%), but restoring the liquidity buffer would require selling $0.45 million worth of long positions and covering $0.45 million worth of shorts. Market declines would be even less problematic. A market decline of 20%, in line with what occurred on Black Monday 1987, would lead to a decline in the value of the long and short positions from $9 to $7.2 million and the liquidity buffer's receipt of $1.8 million from the securities' lenders.

Exhibit 3.7 assumes that returns to the long and short positions are equal. If the market neutral portfolio performs as expected, however, it will experience a positive spread between the returns on the securities held long and the returns on the securities sold short, whether the market rises or falls. Exhibit 3.8 assumes a 2% return spread between the longs and the shorts: The long positions rise 4% and the shorts 2%. Although these movements lead to no margin violation, payment of the $0.18 million in additional collateral owed the securities' lenders reduces the liquidity buffer below 10% of equity; furthermore, long and short positions are no longer balanced. By selling $0.198 million in long positions and covering $0.018 million worth of shorts, the investor can restore the liquidity buffer to 10% and rebalance the portfolio. Differential returns on long and short positions, then, even if favorable to overall portfolio performance, can induce some trading activity.

This type of trading activity can result in the market neutral investor incurring trading costs relative to a long-only investor. The incremental cost should not be excessive, given typical securities price changes. Nevertheless, incorporating trading cost estimates into the portfolio construction process can help to ensure that these costs will not overwhelm expected returns.

Of course, the trading costs of a market neutral portfolio will also reflect its level of leverage. For a fully leveraged portfolio, trading costs will be roughly double the amount for a long-only portfolio. Again, there should be an expectation that the returns to the leveraged portfolio will compensate for these costs. Furthermore, leverage is not a necessary component of market neutral construction. Given an initial $10 million, for example, the investor can choose to invest $5 million long and sell $5 million short. Trading activity for the resulting portfolio will be roughly equivalent to that for a $10 million long-only portfolio.

Conversely, a long-only portfolio can engage in leverage to the same extent as market neutral. Market neutral has the advantage here, however. Purchasing stock on margin can give rise to a tax liability for tax-exempt investors, as dividends and any profits received when the shares are sold give rise to *unrelated business taxable income* (UBTI). According to a January 1995 IRS ruling (Internal Revenue Service Ruling 95-8), however, borrowing stocks to initiate short sales does not constitute debt financing; short sales do not generate UBTI.

Issues Related to Shorting

In order to engage in short selling, the investor must establish an account with a prime broker. In choosing a prime broker to act as account custodian, the investor must employ due diligence to ensure the broker's capability and creditworthiness. The prime broker will clear all trades for the long-short portfolio; although the market neutral investor can execute trades with other brokers, the prime broker usually assesses a "ticket charge" on such "away" trades to cover the costs of bookkeeping. The prime broker will also arrange to borrow shares for shorting. In this capacity, the prime broker must be advised of possible short sales in order to ensure that the shares are available.

The vast majority of shares are available for borrowing, but borrowability may be a problem for some shares, particularly those of small-capitalization companies. Harder-to-borrow shares may also pose problems even after they have been sold short. This is because shares sold short are subject to recall by the lender at any time. In most cases, the prime broker will be able to find alternative lenders for the securities subject to recall, but if these are not available, the market neutral investor will be subject to "buy-ins" and have to cover the short positions. One also occasionally hears about a "short squeeze," in which speculators buy up lendable stock to force a buy-in at elevated prices. This will be more of a problem for dedicated short sellers who take concentrated positions in illiquid stocks than for a market neutral investor holding small positions diversified across many stocks.

Market neutral equity portfolios also incur costs not encountered by long-only, again primarily because of shorting. For instance, investors will rarely receive the full amount of the interest on the proceeds from the short sale of stocks. Retail investors generally receive none of the interest; for this reason, shorting is rarely an economical pursuit for individual investors. The amount of interest received by institutional investors (the short rebate) will reflect a "haircut" that covers the financial intermediation costs associated with securing and providing lendable stock to sell short. The haircut generally averages 25 to 30 basis points off the full interest on the short-sale proceeds, although harder-to-borrow names will require a higher haircut and may even entail negative interest (i.e., the short seller pays, rather than receives, interest).

Finally, short sales are subject to various uptick rules that may cost the short seller in terms of delayed or lost opportunities to trade. Securities and Exchange Commission (SEC) Rule 10a-1, for example, states that exchange-traded shares can be shorted only at a price that is higher than the last trade price ("uptick") or the same as the last trade price if that price was higher than the previous price ("zero-plus tick"). Uptick rules vary across the different exchanges and proprietary trading systems.

Tick tests can be circumvented, but doing so is expensive. For example, the market neutral manager can submit a package of trades to a broker that guarantees their execution at the market's closing prices. Such "principal packages," which are crossed overseas outside U.S. market hours, avoid uptick rules as well as public disclosure of the trades. But brokers charge higher fees for principal packages.

As an alternative to short selling, the market neutral manager can sell deep-in-the-money call options, avoiding both uptick and borrowability problems. Options, however, are generally short-lived, often illiquid, and not available for all securities. In addition, an option seller's profit potential is limited to earning the option premium, no matter how far the underlying stock falls.

Investors and hedgers have long been able to "short" the broad equity market by selling stock index futures. Futures are not subject to uptick rules (although they are subject to various circuit breakers similar to those governing their underlying spot markets). Furthermore, in normal market conditions, several stock index futures contracts offer a great deal of liquidity, hence ease of trading and low transaction costs. Futures on single stocks have recently begun trading and, if they develop sufficient liquidity (a problem so far in European single-stock futures markets), they may offer an alternative to short selling.

For now, the cost of avoiding uptick rules—via principal packages or options—may be greater than any opportunity costs incurred as a result of the rules. Opportunity costs will in any event be greatest for strategies that depend on immediacy of execution. For patient traders, who supply rather than demand liquidity, uptick rules should generally not pose a serious problem.

Management Fees

Management fees for a market neutral portfolio will tend to be higher than those for a comparable long-only portfolio. But if one considers management fees per dollar of securities positions, rather than per dollar of capital, there should not be much difference between market neutral and long-only.

Furthermore, long-only portfolios can contain a substantial "hidden passive" element. Only those portions of a long-only portfolio that represent overweights or underweights relative to the underlying benchmark are truly active; the remaining portion of the portfolio constitutes benchmark weightings, which are essentially passive. To the extent the long-only manager's fee is based on total investments, rather than just the active investments, the long-only fee per active dollar managed may be much higher for long-only than for market neutral. Also, long-short management is almost always offered on a performance-fee basis.

Regulatory Concerns

ERISA's prudence and diversification requirements are fully consistent with the responsible use of market neutral equity strategies. Optimization can control the risk and ensure the proper diversification of portfolios.

Concerns about the tax treatment of shorting were cleared up in January 1995 with the Internal Revenue Service's ruling that borrowing shares to initiate short sales does not constitute debt financing. As we have noted, short sales do not give rise to UBTI. By contrast, buying stocks on margin can result in UBTI.

In August 1997, the short-short rule was rescinded. Mutual funds can now short without jeopardizing their tax pass-throughs. This has prompted a few mutual funds to offer market neutral strategies. More taxable investors will now be able to benefit from the added flexibility of market neutral management. Such investors should realize that a market neutral portfolio may engage in higher turnover and thus have tax consequences not encountered in long-only. Investors should always evaluate strategies net of all costs, whether these costs relate to trading, management, or taxes.

Risk

Market neutral equity portfolios are often portrayed as inherently riskier than long-only portfolios. This view in part reflects a concern for potentially unlimited losses on short positions. While it is true that the risk of a short position is theoretically unlimited because there is no bound on a rise in the price of the shorted security, this source of risk is considerably mitigated in practice. It is unlikely, for example, that the prices of all the securities sold short in a market neutral portfolio will rise dramatically at the same time, with no offsetting increases in the prices of the securities held long. Also, the trading imperatives of market neutral, which call for keeping dollar amounts of longs and shorts roughly equalized on an ongoing basis, will tend to limit short-side losses, because shorts are covered as their prices rise. And if a gap-up in the price of an individual security does not afford the opportunity to cover, the overall portfolio will still be protected provided it is well diversified.

A market neutral portfolio will incur more residual risk than a comparable long-only portfolio to the extent it engages in leverage and/or takes more active positions. A market neutral portfolio that takes full advantage of the leverage available to it will have at risk roughly double the amount of assets invested compared with a long-only portfolio. And because it is not constrained by benchmark weights, a market neutral portfolio may take larger positions in securities with higher (and lower) expected returns compared with a long-only portfolio. But both the degree of leverage and the "activeness" of the market neutral portfolio are within the control of the investor.

It is ultimately the investor who decides the market neutral portfolio's level of residual risk. As noted above, given an initial $10 million, the investor may choose to invest only $5 million long and sell $5 million short, in which case the amount at risk in securities will be identical to that of a $10 million long-only investment. And the investor will determine the activeness of the positions taken by selecting the desired level of portfolio residual risk. With integrated optimization, long and short selections will be made jointly, with a view to maximizing expected return at the desired level of risk; risk will not be incurred without the expectation of a commensurate return. Given the added flexibility it affords in the implementation of investment insights, market neutral portfolio construction should be able to improve upon the excess returns available from long-only construction based on the same set of insights, whatever the risk level chosen.

Risk control is absolutely key, of course, but this is true for long-only portfolios as much as for market neutral portfolios. It is important that, whatever methods the investor uses to select securities and construct portfolios, they are broad enough to capture risk and return elements beyond just market risk. Some market neutral investors do so by using pairs trading, where each long candidate is matched with a very similar short candidate (for example, Intel long and AMD short). Others focus on constructing market neutral portfolios entirely from companies within the same industry. Jacobs Levy uses a proprietary multifactor approach that assesses both returns and risks along the same multiple dimensions. This enables us to use a range of securities to build portfolios that are diversified across numerous finely defined risk exposures and industries and that are designed to offer incremental return while controlling incremental risk.[11]

In sum, although market neutral is often perceived and portrayed as much costlier and much riskier than long-only, it is inherently neither. Much of the incremental costs and risks are either largely dependent on the amount of leverage employed or controllable via optimization. Those that are not include the financial intermediation costs of borrowing shares to sell short, trading costs incurred to balance long and short positions and meet margin requirements, the opportunity costs imposed by uptick rules, and the risks of unlimited losses on short positions. In general, these costs will not be large enough to invalidate the viability of long-short investing.[12]

EVALUATING LONG-SHORT

As we have noted, in an integrated optimization, long and short positions are determined jointly. The result is a single equity portfolio offering a return in the form of the spread between the returns on the long positions and the returns on the short positions. In addition to this spread, the market neutral portfolio receives the short rebate and any interest on the liquidity buffer; this interest income will generally approximate the Treasury bill rate.

Although the active return to a market neutral equity portfolio is generated by security selection, the performance of a market neutral equity portfolio is not comparable to that of a long-only equity portfolio. Unlike a long-only portfolio, the market neutral portfolio will not reflect the return to (or the risk of) the equity asset class from which its securities have been selected. The proper return benchmark for a market neutral equity portfolio is the short-term rate represented by the short rebate. Portfolio return in excess of this rate represents the value-added from stock selection.

Different Market Environments

A market neutral portfolio is designed to offer value-added in the form of security selection, whatever the underlying market environment. Market downturns should not prove an impediment to this achievement.

Furthermore, market neutral portfolios may be able to handle certain market situations more readily than long-only portfolios. In the mid to late 1990s, for example, price advances in the market seemed to be confined very narrowly to the largest-cap stocks. It seemed for a time that investors were only interested in buying the top 50 to 100 names in the market. Long-only active managers faced a real problem eking out excess returns. By contrast, market neutral managers did not have to suffer from a liquidity effect bidding up the largest-cap stocks.

Nevertheless, market neutral portfolios in practice may contain biases that make them susceptible to trends in the underlying market. For example, a market neutral portfolio that does not take explicit account of market capitalization may either gain or lose unexpectedly because of a large-cap bubble. Similarly, investors who sold short the most overvalued stocks in the late 1990s, without regard to diversification across industries, likely found themselves with concentrated short positions in tech stocks—and substantial losses, as that bubble continued to expand. A security selection process that is implicitly biased toward growth or value disciplines can also have unwanted results; in the big run-up in the market in the 1990s, as growth stocks on average outperformed value stocks, market neutral portfolios that emphasized value attributes suffered.

Of course, these types of concerns are common to long-only as much as to market neutral equity management. It is crucial for investors to understand clearly the sources of a portfolio's return and risk, whether that portfolio is long-only or market neutral. It is also crucial to be able to act upon that understanding, whether that means having the flexibility to be dynamic and responsive to changing developments or the discipline (and liquidity) to stay the course through difficult, but temporary, market environments.

IMPORTANCE OF INVESTMENT INSIGHTS

Besides analyzing the operational considerations involved in market neutral management, investors need to evaluate carefully the value-added potential of the security selection approach underpinning it. Any active equity management approach can be adapted to a market neutral mode. In the past, investors (including hedge funds) that engaged in short selling tended to focus on in-depth fundamental analyses of specific companies, as they attempted to exploit given situations such as perceived fraud or expected bankruptcy. As short selling began to be incorporated into structured long-short portfolios, however, a more quantitative approach took hold. Today, most market neutral managers use a quantitative rather than a traditional judgmental approach.

Traditional judgmental approaches, because of their in-depth nature, are usually limited in the number of stocks they can cover. This in turn limits the range of opportunities that can be exploited by the portfolio. Traditional analyses also generally result in subjective buy, hold, and sell recommendations that are difficult to translate into directions for building portfolios.

By contrast, quantitative approaches can be applied to a large universe of stocks, which tends to increase the number of potential investment opportunities detected. A quantitative process also generally results in numerical estimates of risk and return for the whole range of securities in the universe. Short sale candidates fall out naturally as the lowest-ranking members of the universe. Furthermore, the numerical estimates are eminently suitable inputs for portfolio optimization, allowing for the construction of portfolios that take explicit account of risk in their pursuit of return.

Of course, the performance of a market neutral portfolio ultimately depends on the goodness of the insights going into it, whether those insights come from a judgmental or a quantitative approach. Our own insights emerge from our belief that the equity market is a complex system. We believe that stock price behavior is not random, but is permeated by a web of interrelated return effects. These return regularities, or mispricings, give rise to potentially profitable opportunities for active investment. However, these opportunities are not detectable through simple approaches such as dividend discount modeling or even capital asset pricing theory. Rather, they require models capable of capturing the market's complexity.

To that end, we employ intensive statistical modeling, guided by intuition and experience, to examine the effects of a multitude of variables on a broad and diverse range of stocks—large-cap growth and value as well as small cap. We look at company fundamentals, such as price-earnings ratios and dividend yields. We search for evidence of the impact of investor psychology, such as herding and overreaction. We look at economic variables such as interest rate spreads and changes in foreign exchange rates. We also consider informed signals from management and analysts, including share repurchases and analyst recommendations. Ongoing research helps us to anticipate how return-variable relationships change over time.

The return to any one stock may demonstrate an exploitable (i.e., predictable) response to a number of these variables. One of the keys to our approach is to examine all relevant variables simultaneously, so as to isolate the effect of each one. For example, does a consistent abnormal return to small-cap stocks reflect their relatively low P/E levels? A lack of coverage by institutional investors? Tax-related buying and selling? Or some combination of factors? Only by "disentangling" effects can one uncover real profit opportunities.[13]

Our approach to security valuation combines breadth of inquiry with depth of analysis. Breadth of inquiry maximizes the number of insightful profit opportunities that can be incorporated into a portfolio and provides for greater consistency of return. Depth of analysis, achieved by taking into account the intricacies of stock price behavior, maximizes the "goodness" of such insights, or the potential of each one to add value.[14] Market neutral portfolio construction, with the flexibility it affords in pursuing returns and controlling risk, enhances our ability to implement these insights.

NOTES

[1] In practice, lenders of stock will usually demand that collateral equal something over 100% of the value of the securities lent (usually 105%).

[2] Reg T does not cover U.S. Treasury or municipal bonds or bond funds. Furthermore, Reg T can be circumvented by various means. Hedge funds, for example, often set up offshore accounts, which are not subject to Reg T. Broker-dealers are subject to much less stringent requirements than Reg T, and hedge funds and other investors may organize as their own broker-dealer or arrange to trade as the proprietary account of a broker-dealer in order to attain much more leverage than Reg T would allow. See Bruce I. Jacobs, Kenneth N. Levy, and Harry M. Markowitz, "Portfolio

Optimization with Factors, Scenarios and Realistic Short Positions," forthcoming, *Operations Research*.

[3] As we have noted, the short rebate is arrived at by negotiation. The investor may incur a larger or a smaller haircut than we have assumed here. Retail investors who sell short rarely receive any of the interest on the proceeds.

[4] See Bruce I. Jacobs and Kenneth N. Levy, "Long/Short Equity Investing," *Journal of Portfolio Management*, Fall 1993. Also in translation, *The Security Analysts Journal of Japan*, March 1994; and Bruce I. Jacobs, "Controlled Risk Strategies," in *ICFA Continuing Education: Alternative Investing* (Charlottesville, VA: Association for Investment Management and Research, 1998).

[5] Jacobs and Levy, "Long/Short Equity Investing."

[6] Edward M. Miller, "Why the Low Returns to Beta and Other Forms of Risk?" *Journal of Portfolio Management*, Winter 2001.

[7] See Bruce I. Jacobs, "Momentum Trading: The New Alchemy," *Journal of Investing*, Winter 2000.

[8] Bruce I. Jacobs and Kenneth N. Levy, "More on Long-Short Strategies," *Financial Analysts Journal*, March/April 1995.

[9] The long-only portfolio can also engage in leverage, just like the long-plus-short portfolio. (However, a long-only portfolio would have to borrow funds to achieve leverage, and this can have tax consequences for otherwise tax-exempt investors; borrowing shares to sell short does not result in unrelated business taxable income.) Furthermore, derivatives such as index futures contracts can be used to make the long-only portfolio market neutral—just like the long-short portfolio. Thus neither market neutrality, nor leverage, nor even shorting constitutes an inherent advantage over long-only portfolio construction. See Bruce I. Jacobs and Kenneth N. Levy, "20 Myths About Long-Short," *Financial Analysts Journal*, September/October 1996; and Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *The Journal of Investing,* Spring 1997.

[10] Bruce I. Jacobs, Kenneth N. Levy, and David Starer, "On the Optimality of Long-Short Strategies," *Financial Analysts Journal*, March/April 1998; and Bruce I. Jacobs, Kenneth N. Levy, and David Starer, "Long-Short Portfolio Management: An Integrated Approach," *Journal of Portfolio Management*, Winter 1999.

[11] James A. White, "How Jacobs and Levy Crunch Stocks for Buying—and Selling," *Wall Street Journal*, March 20, 1991.

[12] Bruce I. Jacobs and Kenneth N. Levy, "Using a Long-Short Portfolio to Neutralise Market Risk and Enhance Active Returns," in Ronald A. Lake (ed.), *Evaluating and Implementing Hedge Fund Strategies*, *3rd* ed. (London: Euromoney Books, 2004).

[13] See Bruce I. Jacobs and Kenneth N. Levy, "Disentangling Equity Return Regularities: New Insights and Investment Opportunities," *Financial Analysts Journal*, May/June 1988; also in translation, *The Security Analysts Journal of Japan*, March and April 1990; and Bruce I. Jacobs and Kenneth N. Levy, *Equity Management: Quantitative Analysis for Stock Selection* (New York: McGraw-Hill, 2000).

[14] Bruce I. Jacobs and Kenneth N. Levy, "Investment Analysis: Profiting from a Complex Equity Market," in Frank J. Fabozzi (ed.), *Active Equity Portfolio Management* (New Hope, PA: Frank J. Fabozzi Associates, 1998).

CHAPTER 4

Convertible Bond Hedging

Jane Buchan, Ph.D.
Managing Director
Pacific Alternative Asset Management Company

Convertible bond hedging typically involves purchasing a convertible security and shorting the stock into which it is convertible. Shorting reduces the investor's exposure to changes in the stock price, because price movements in the convertible are at least partially offset by the price movements of the short stock position. More sophisticated variants include hedging so that the net expected position is fully hedged with respect to changes in the stock price, or hedging so that the net expected position is also fully hedged with respect to changes in interest rates and/or credit spreads.

Convertible hedging has been around for years. Warren Buffett is reported as saying: "I got my start at age 21 arbitraging convertible bonds against the underlying securities."[1] The reported returns generated by the strategy are relatively stable, averaging 13% to 16% per year on a leveraged basis, with relatively few periods of negative performance.[2] This chapter reviews the basic strategy, provides results from a study of convertible bond hedging, and raises several practical implementation issues.

CONVERTIBLE SECURITIES

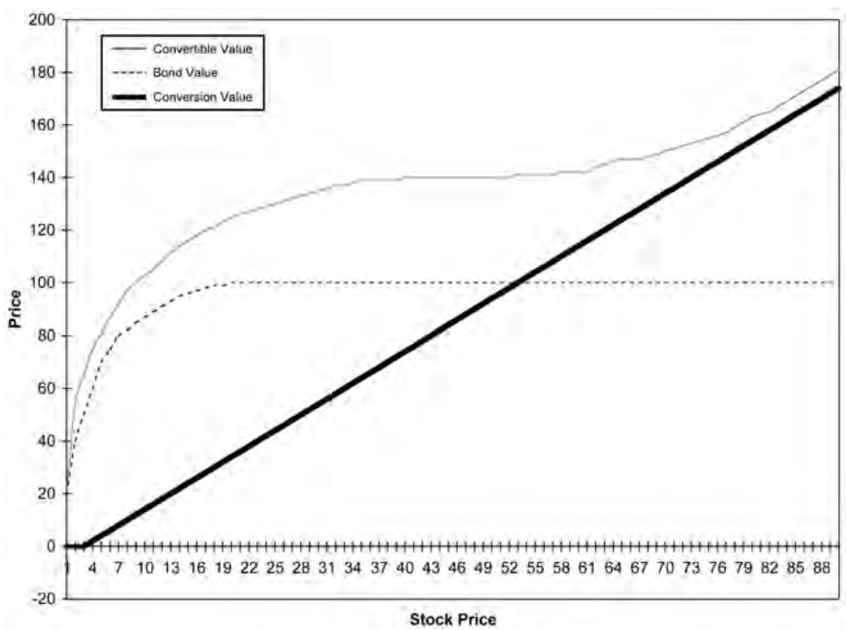
There are two basic types of convertible securities—convertible bonds and convertible preferred stock. A convertible bond is a bond issued by a corporation that can be converted (typically) into shares of the stock of that corporation. The investor converts the bond by surrendering it to the corporation or its agent and receiving shares in the company.

A convertible bond, like other bonds, has a maturity, a coupon rate, and a call schedule. In addition, because it is convertible, it has a conversion ratio, which gives the number of shares into which it is convertible. For example, if the conversion ratio is 30, the bond can be converted into 30 shares of stock. The conversion ratio can also include a fractional amount, indicating that the bond is convertible into less than one full share of stock.

Although a convertible bond is usually convertible into shares of the issuing company, this is not always the case. Company X, for example, may own a significant amount of stock of Company Y. It may decide to liquidate its holdings of Y by issuing convertible bonds that are convertible into shares of Company Y. Bonds that are convertible into shares of a company other than their issuer are commonly referred to as exchangeable securities. There are also convertible bonds that are redeemable for other bonds, such as U.K. government gilts.

Exhibit 4.1 graphs a hypothetical convertible bond. The maturity on the bond is seven years, and it pays an annual coupon of 10%. It is

EXHIBIT 4.1 Prices of Hypothetical Convertible, Its Bond and Conversion Values



convertible into 20 shares of stock of the issuing company. The current interest rate on the issuer's bonds is 10%.

The graph shows three lines. The dotted line is the value of the bond-only part of the security. This is often referred to as its bond value. Bond value is usually stable, reflecting the maximum amount the bondholder can earn—the interest on and the face value of the bond. Even if the value of the company increases, as evidenced by rising share price, the bond value stays level. Note, however, that if the company's value falls sufficiently, so that the company nears bankruptcy, the bond value declines. This reflects the fact that, in the event of bankruptcy, bondholders may not fully recover the face value of their bonds.

The dark solid line in Exhibit 4.1 is the security's conversion value—the value of the security if it is converted into stock. This line is obtained by multiplying the conversion ratio by the share price. The conversion value thus rises and falls with the value of the company's stock.

Because the holder of the convertible can either ignore the conversion option and hold the bond until maturity or convert it, the convertible has to be worth at least the higher of its bond-only value or its conversion value. In fact, the convertible is actually worth more, because the convertible holder has the option to convert the bond at his or her discretion. The light solid line in Exhibit 4.1 gives the value of the convertible reflecting this option.

Why is the convertible's value greater than either its bond value or its conversion value? First, assume the company's share price is low, so that the convertible holder would not choose to redeem the convertible for stock, but would rather keep the bond and receive its face value at maturity. (More formally, the convertible's current bond value exceeds its conversion value.) There is the chance, however, that the stock price could rise substantially at some point prior to the maturity of the bond, so that the bondholder would want to redeem the convertible for the stock. (More formally, the bond's conversion value exceeds its bond value.) As long as there exists some chance of converting favorably into stock, the convertible must trade for more than the otherwise identical straight bond represented by its bond-only value.

Second, assume the stock price is high and the convertible's conversion value exceeds its bond value. It would seem to make more sense to convert the bond into stock rather than hold it to maturity and redeem it for face value. In this case, however, there is the chance that the stock price could fall substantially before the convertible reaches maturity; if that were to happen, the convertible holder's downside would be limited by the convertible's bond value. An investor would therefore prefer the convertible to an unprotected stock position equal in value to the convertible's conversion value.

Clearly, the additional amount a buyer of a convertible is willing to pay over either its bond-only value or its conversion value depends upon the likelihood that the conversion option will be exercised. This likelihood, hence the value of the embedded conversion option, will be greatest at the intersection of the bond-only value and the conversion value.

DELTA AND DURATION

Two concepts facilitate discussion of convertible securities—the likely change in the value of the convertible given a change in the price of the stock, and the likely change in the value of the convertible given a change in interest rates. The first concept is often referred to as delta. More rigorously, the delta of a convertible is defined as the convertible's rate of change with respect to a change in the stock price. Mathematically, it can be written as:

$$\text{Delta} = (\partial C/\partial S)$$

where C is the value of the convertible and S is the price of the stock.

As the underlying stock price rises, the bond's conversion value increases. As the convertible's value approaches its conversion value, the bond is said to become deeply in-the-money. As this happens, the convertible's delta approaches one, meaning that the convertible begins to move one-to-one with the stock price. As the stock price falls, the convertible moves out-of-the-money. The convertible's delta approaches zero and the convertible behaves more and more like a bond, with small changes in stock price having little effect on its value.

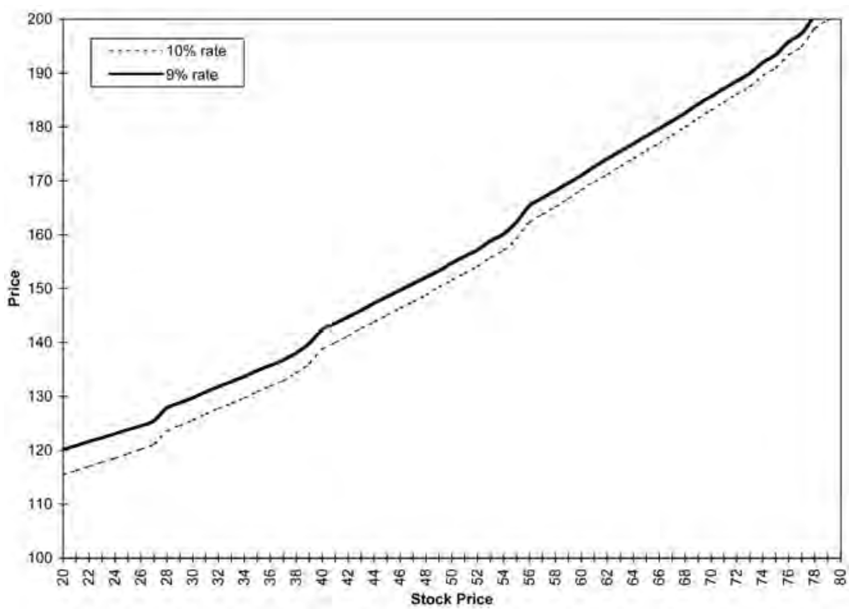
The second concept—the likely change in value of the convertible, given a change in interest rates—is captured by the bond's duration.[3] Mathematically, duration can be defined as:

$$\text{Duration} = (\partial C/\partial r)/C$$

where C is the value of the convertible and r is the interest rate.

Exhibit 4.2 illustrates the value of the convertible and the bond's duration if interest rates change by 100 basis points. The dashed line represents the value of the convertible when the general level of interest rates is 10%. The solid line represents the value of the convertible when the general level of interest rates is 9%. It is obvious that interest rate changes will have a greater effect on the convertible's price when the convertible is out-of-the-money than when it is deeply in-the-money.

EXHIBIT 4.2 Prices of Hypthetical Convertibles Under a 100-Basis-Point Interest Rate Change



It should be noted that these relationships break down when the issuing company's share price declines drastically. In that event, there is significant credit risk—in other words, the potential that the company may go bankrupt. The convertible then becomes what is known as a busted security. Its pricing is driven by liquidation, or recovery, values, rather than either the company's stock price or interest rates. Busted convertibles are traditionally treated as part of the distressed security universe, rather than as hedgeable convertible bonds.

In summary, when the convertible is deeply in-the-money, it is very sensitive to changes in stock price and not very sensitive to changes in interest rates. When it is out-of-the-money, the reverse is true (barring fears of bankruptcy). These two concepts of delta and duration drive convertible bond hedging.

HEDGING CONVERTIBLES

Convertible bond hedging typically involves purchasing a convertible bond and shorting an appropriate amount of the issuing company's stock so that the net position is delta neutral. Being delta neutral means that if the underlying stock price were to move, any change in the value of the convertible would be offset dollar for dollar by a change in the value of the short stock position. More sophisticated variants of convertible bond hedging include hedging the convertible's interest rate risk by shorting interest rate futures so that the combined position is duration neutral as well as delta neutral.[4]

The March 1, 1993 issue of *Value Line Convertibles* offers an example. The Staples Inc. 5% coupon convertible bond due in 1999 is purchased at a price of $965. The appropriate delta-neutral stock hedge ratio, according to Value Line, is 0.40. That is, for every dollar invested in the convertible, 40 cents of the underlying stock should be shorted. With Staples stock trading at $31.50 per share, one would short 12.3 shares of stock for each convertible purchased. *Value Line Convertibles* gives the appropriate interest rate hedge ratio as $2.09 for a 100-basis-point shift in interest rates. This would require shorting 0.00209 of a five-year futures contract.

Exhibit 4.3 shows the computation of the return on a portfolio comprised of a long position in the Staples convertible bond plus a short position in the underlying stock. This computation assumes no movement in the underlying stock price, hence is often called the standstill or static rate of return. The standstill rate can be thought of as the cost-of-carry of the trade. In this case, it is the coupon income on the bond plus the short rebate on the proceeds of the short sale minus the dividend yield on the shares sold short. For the Staples position, the annualized standstill rate of return is 6.19%.

What if the Staples stock were to move, while interest rates remained unchanged? Exhibit 4.4 gives the cash flows in this case. Whether the stock moves up by $1.00 or down by $1.00, the overall portfolio value remains essentially unchanged.[5] The portfolio, which had a value of $579 when the underlying stock was priced at $31.50, is worth $579.25 if the stock's price falls by one dollar and $579.75 if the stock's price rises by one dollar.

The short stock position hedges the portfolio against changes in the convertible bond's value resulting from changes in the underlying stock

EXHIBIT 4.3 **Computation of Standstill Return in the Convertible Bond Hedge**

Coupon Income	$50.00
Short Rebate (@85% of 2.96%)	$9.75
Dividends Paid on Short Sale	$0.00
Total	$59.75
Percentage Return	6.19%

EXHIBIT 4.4 Computation of Hedging Returns in the Convertible Bond Hedge

	Stock Price Per Share		
	\$30.50	**\$31.50**	**\$32.50**
Expected Convertible Value	\$953.00	\$965.00	\$978.00
Value of the Short Stock (12.25 shares)	\$373.75	\$386.00	\$398.25
Difference	\$579.25	\$579.00	\$579.75
Net Change	\$0.25		\$0.75

price. A short position in interest rate futures would similarly hedge the portfolio against changes in the convertible bond's value due to changes in interest rates.

The Staples example omits items such as transaction costs and focuses on only one security at one point in time. In a broader context, and accounting for transaction costs and other factors, a convertible hedging strategy should yield no excess returns *if* markets are efficient. If markets are efficient, all assets are fairly priced and there are no arbitrage opportunities offering abnormal returns.

AN EMPIRICAL ANALYSIS

Can convertible bond hedging yield excess returns? I constructed a portfolio of convertible bond trades for the period January 1989 to July 1996. This time period was chosen because it included both up and down markets in stocks and bonds.

Data were collected for each of the 90 months using *Value Line Convertibles* as the primary source. In order to simplify the process, and to better reflect real-world trading conditions, only convertible issues of at least \$100 million in size were included in the sample.

The portfolio started out with equally weighted positions in all available convertible bonds and preferred stocks over \$100 million in issue size. The portfolio was rebalanced monthly. On average, it included 146 convertible securities.

To hedge the portfolio's stock price exposure, each convertible's underlying stock was shorted in the amount given by Value Line. To hedge the portfolio's interest rate exposure, five-year Treasury note futures were shorted in the amount specified by Value Line.

The portfolio accrued coupon income over the course of each month. Dividends owed as a result of the short sale of stock were also accrued in order to facilitate computations. The portfolio was assumed to earn a short rebate equal to 85% of the three-month Treasury bill return on the dollar amount of the proceeds from the short sales.

Transaction costs were assumed to be \$0.10 per share on both the sale and purchase of stock. Convertible bond and preferred transaction costs were assumed to be one full point (\$10 on a standard \$1,000 face bond) on both purchases and sales. The transaction cost for a five-year Treasury future was assumed to be \$20 per contract on a round-trip basis.

Results

For the period, the average monthly return on the portfolio was 75.53 basis points, or 9.06% per year (on an unleveraged basis). The average monthly excess return over Treasury bills was 30.37 basis points, or 364 basis points per year. In only 19 of the 90 months were the total returns negative.[6]

On the surface, these results appear to suggest that there are inefficiencies in asset pricing that can be exploited by convertible bond hedging. In fact, the data suggest that the inefficiencies are so large that it is possible not only to generate significant alpha, but to do so with a high degree of consistency. One must ask whether an incorrect assumption in the analysis, or hidden risk, can explain this.

Perhaps the analysis underestimated the impact of transaction costs. To test this possibility, I repeated the analysis using various levels of transaction costs. More precisely, I asked how large transaction costs would have to be in order to eliminate all the alpha. Bringing returns down to Treasury rates of return required abnormally large assumptions for transaction costs, on the order of \$0.69 per share for a stock purchase or sale. It seems unlikely that underestimation of transaction costs can account for the excess returns to the hedged convertible bond portfolio.

Do the excess returns represent a compensation for bearing risk? Perhaps the portfolio was not perfectly hedged to be delta neutral and/or duration neutral. If the portfolio were not hedged correctly, the excess returns would represent compensation for residual interest rate or stock market risk. To test this possibility, I regressed the hedged convertible bond returns on both stock and bond indexes. The results indicated that the hedged portfolio had no net exposure to either the stock or the bond market.

In summary, it would appear that, over this period at least, investors could have attained significant excess returns by investing in and hedging convertible securities. In fact, this period saw the operation of several hedge funds dedicated to the strategy.

IMPLEMENTATION ISSUES

When implementing a hedging strategy, several important issues arise. First, how does one determine the composition of the hedge? Second, how important is credit risk, given that convertibles are typically very junior securities in the capital structure? Finally, what about practical issues such as the availability of stock to borrow in order to execute necessary short sales?

Determining the composition of the hedging portfolio requires two steps: (1) using a model to determine the amount of securities or derivatives that should be shorted and (2) using judgment to modify this amount, when appropriate. There are many software packages that can evaluate convertibles and give the appropriate hedges. However, behind these programs are models dependent on several difficult to estimate variables, including the future volatility of underlying stock prices and the likelihood of an issuer calling a given convertible. Investors must make judgments about these variables. Different individuals using the same software can thus come up with very different hedging portfolios.

Furthermore, an investor may prefer a less than full hedge of the convertible portfolio's delta and/or duration risk. For example, if the investor believes that interest rates are going to decline, he or she may want to retain some exposure to interest rate risk so that the portfolio can profit if the expectation of falling rates turns out to be correct. Many convertible hedgers retain some delta exposure so that they can profit from the long-term upward trend of stock prices.

Another issue involves *busted securities*. When an issuer faces credit trouble, its convertibles may be the first to feel it, as they are usually the most junior debt security. After paying off more senior debt, the issuer may not find much left on the left-hand side of the balance sheet to cover the value of its convertibles. As a result, convertible prices can fall dramatically when the specter of bankruptcy raises its head.

An abrupt decline in a convertible's price due to fears of bankruptcy creates particular problems for the convertible hedger. As we noted earlier, the convertible's delta, which represents the amount of stock to be sold short against the convertible, normally approaches zero as the convertible moves further and further out-of-the-money (that is, as its conversion value declines). When there is a threat of bankruptcy, however, delta increases toward one and in fact may at times exceed one. This is because the convertible's bond value starts to approach zero, leaving only its conversion value (the stock price).

As bankruptcy fears begin to materialize, the convertible hedger may have to sell substantial amounts of stock short. Of course, other investors will also be selling the stock, or selling it short, driving its price down. Given the uptick rule (i.e., no short sales on a downtick), shorting may become impossible or at least impractical. The investor should thus do some credit research in order to avoid purchasing potential busted securities in the first place.

Several other practical problems arise in relation to short selling. For example, it may be difficult to borrow some securities in order to sell them short. Even if the stock can be borrowed, the short seller faces the risk that the stock may be subject to a buy-in. If the broker cannot find other shares to substitute for the ones called in, the convertible position may be left unhedged or only partially hedged.

Leverage presents another set of problems. Regulation T, covering equity investments, allows an investor to purchase \$1.00 worth of stock long and to sell short \$1.00 worth of stock for every \$1.00 of equity capital. But the margin rules on hedged convertibles differ from the standard stock margin rules. A long convertible position combined with its corresponding short position is effectively treated as zero net investment, because the convertible holder can convert the bond into the shares sold short. Convertible bond hedgers may thus be able to leverage up by twice as much as equity investors. Furthermore, if one is operating outside the purview of Regulation T—as a broker-dealer or hedge fund, say—even higher leverage is available. In fact, some hedge funds have leverage levels corresponding to a long convertible value of up to 13 times the equity capital in the account.

Leverage will magnify gains from convertible hedging, but it will also magnify losses. In addition, brokerage firms may increase margin requirements at higher levels of leverage. The investor may thus be subject to financing costs, as well as incurring the normal costs associated with financing a highly leveraged position.

A FINAL NOTE

Both anecdotal evidence and more rigorous studies suggest that convertible hedging can generate returns in excess of the risk-free rate, and has done so for decades. In fact, the returns of many convertible bond hedge funds suggest that this phenomenon has continued in recent years. These excess returns do not seem to be explainable in terms of transaction costs or in terms of imperfect hedging. They may nevertheless represent a compensation for bearing less discernible sources of risk.

One hypothesis that has been suggested is that the excess returns represent compensation for bearing liquidity risk. In this view, convertible hedgers are price-takers rather than price-makers. They respond to other investors' demands to sell or buy positions. These investors pay up to execute, and the excess returns to convertible hedgers really represent a premium for providing liquidity. The returns to a convertible hedging strategy may thus depend upon the degree of price-taking in markets, and on the hedger's willingness to bear liquidity risk. This hypothesis would seem to be supported by the performance of convertible bond hedge funds during the liquidity crises in 1987, 1990, 1994, 1998 and, most recently, 2002. These funds generally experienced negative quarters corresponding to the market turmoil.

Nevertheless, the evidence from the past several decades indicates that a strategy of purchasing convertible securities and hedging their stock and interest rate risks has been profitable. Investors willing and able to deal with the complexity of convertible bond hedging should consider the strategy as a source of potential alpha.

NOTES

[1] *Forbes*, November 23, 1992.

[2] For example, see Pacific Alternative Asset Management Company's database as well as other publicly available databases on convertible hedge funds.

[3] Alternatively, duration is sometimes referred to as rho.

[4] Convertibles with significant interest rate risk and little stock risk are rarely candidates for hedging.

[5] The reason that the return is not exactly zero is that an embedded option is being hedged through time, and the closer the convertible gets to maturity, the less valuable the conversion option becomes. This is known as time decay. The slight positive return generated offsets the effect of time decay.

[6] These returns are hypothetical results based on a simulated backtest. Hypothetical results do not represent actual trading and may not reflect the impact that material economic and market factors might have had on the decision-making process underlying an actual portfolio. Furthermore, the returns, while net of estimated transaction costs, do not reflect management fees; actual client returns would have been reduced by such fees and other expenses.

CHAPTER 5

Sovereign Fixed-Income Arbitrage

John Maltby
Chief Investment Officer
DKR Capital Inc.

Many investment managers claim to be running market neutral strategies that exploit relative value opportunities. These claims are, without a doubt, honestly made. The managers believe they are offering a product that is less risky than a long-short or directional strategy. However, there is more to being market neutral than being flat in an asset class. Investors need to do more than take assertions of market neutrality at face value.

A market neutral trading strategy can be defined loosely as one that is not dependent on overall market movements in order to succeed, and that is immune from harm caused by overall market movements. A relative-value strategy is one that takes advantage of price anomalies between fundamentally similar instruments. Clearly these loose terms admit a wide range of potential trading strategies, most of which, however, fail to live up to the definition of market neutral once they are tested.

In the realm of fixed income, market neutral has been used to describe various macrostrategies that can turn out to be extremely market dependent, and that involve fundamentally unrelated assets. Trading the yield curve, for example, is commonly viewed as a market neutral arbitrage strategy. Certainly, the price of a government bond of one maturity is related to that of another issue of the same government with

The author thanks his colleagues Todd Saumier and Anirudh Bagchi, Ph.D. for their input and assistance.

a different maturity. To some extent, the differences between the two in duration and convexity can be hedged, although the hedge will need constant monitoring as market prices change. The yield curve, however, is subject to many different influences—supply by the government, monetary policy, and macroeconomic expectations. There are times when the yield curve may be more volatile than the general level of yields.

A second common error is to term trades between countries or between different credits market neutral. Assets of different countries may show a high degree of correlation, but when one or the other market encounters stress, liquidity and other local characteristics can come to the fore. For many years, for instance, the Canadian government bond market traded in a fashion sympathetic to the U.S. market. The two economies and cultures have much in common, but differ substantially in political structure, range of industries, and structure of credit markets. Over the last 10 years, the spread between Canadian government and U.S. government 10-year notes has fluctuated in a range of 300 basis points, while the outright level of yields has moved 400 basis points. Correlation can be temporary and without causality.

The Canada-U.S. trade illustrates another pitfall of intercountry trading. During the same 10-year period, the Canadian dollar had a range from 1.12 cents to nearly 1.60 cents per U.S. dollar. Thus, even if yield spreads trend together temporarily, the bond trade will require continual and unpredictable rehedging of currency gains or losses. Gain or loss on the combined bond portfolio is likely to be small compared with the gain or loss from currency fluctuations.

We describe below several strategies that fit a narrow definition of market neutral. With one exception, all the strategies involve transactions within a single currency, so the only currency risk involves the rate at which the strategy's profit or loss is converted to the portfolio's host currency. As will be shown, every strategy has an element of price risk, as well as other types of risk. Market neutral describes an ideal, rather than a practical reality.

BASIS TRADING

Basis trading involves the purchase or sale of government bonds and the concurrent sale or purchase of futures contracts on the bonds. A bond futures contract will behave similarly to the underlying bonds, as it draws most of its characteristics—namely, its duration and convexity—from the bonds that are deliverable against it. As anyone who has ever used futures to hedge knows, however, a futures contract is a change-able thing. It is critical for bond traders to be able to gauge the effect on portfolio yield of changes in the price of the futures contract.

One way to do this is to examine the cash-futures basis. For our purposes, the basis can be defined as the price difference between a cash bond and the futures contract it is hedged against, adjusted by a conversion factor (discussed later). The basis trade not only offers insight into why futures prices may change, it constitutes a key strategy for market neutral investing.

A simple basis trade—going long the basis—is to buy the cash bond and sell futures contracts. For now, we will assume there is only one bond deliverable against the futures contract. In reality, multiple bonds may be delivered to satisfy the terms of a contract, and the bondholder will seek to deliver the cheapest of these.

Exhibit 5.1 provides an example of a long basis trade, using the U.K government gilt 7.25% of 2007 and the March 1999 gilt futures contract. This trade is also known as a cash-and-carry trade. The futures are sold, and the bonds are purchased with borrowed funds and held until the futures delivery date, when they are delivered in fulfillment of the futures contract requirement.

EXHIBIT 5.1 **Cash and Carry—UKT 7.25% 12/07**

Settlement Date:	11/23/99	Futures Price:	116.40
Delivery Date:	3/1/99	Conversion Factor:	1.0160769
Notional Value:	£10,000,000		
Start Price:	118.13	Gross Basis:	–0.1410
Start Accrued Interest:	£203,402.74	Net Basis:	–0.0577
End Accrued Interest:	£167,307.69		
Coupon:*	£362,500.00		
Funding Rate:	6.40%		
Forward Price:	118.213628		

*Coupon payment on December 7.

Starting Invoice:	((Notional value × Bond price) + Start accrued interest)/100
Funding:	((Starting invoice × Funding rate)/365) × (Start date – Delivery date)
Forward Price:	(Starting invoice + Funding – Coupon – Accrued interest)/ (Notional value × 100)
Gross Basis:	Bond price – (Futures price × Conversion factor)
Net Basis:	Forward bond price – (Futures price × Conversion factor)

Delivering the bond against the futures will result in a credit of:

$$\text{Futures price } 116.4 \times \text{Conversion factor } 1.0160769 = 118.271351$$

The trader will realize a profit equal to the difference between this credit and the cost of buying and funding the bond, or 0.0577 (118.271351 – 118.213628). In bond terminology, the net basis is the cost of buying and funding the bond less the delivery receipt, so the net basis in the example is expressed as –0.0577.

It is normally very unusual to have a negative net basis. But the trade in Exhibit 5.1 reflects the stressed conditions of the bond and bond futures markets at the end of 1998. Market participants were sidelined by reduced capital and were reluctant to take on risk of any kind. As spreads widened, those able to obtain funding found opportunities such as the trade in Exhibit 5.1.

Note that, while this trade was relatively low in risk, it required a lot of capital and the return was relatively low. For this type of trade, many traders would use high amounts of leverage to increase their return on capital. On the other hand, the trade in Exhibit 5.1 offered an extra bonus in that the bonds could be delivered against the futures at any time between March 1 and March 31. If funding rates declined, the trader could have eked out an extra gain by funding the bonds through the month of March at the new, low rates. This option appears to be free.

The hedger of a long cash bond position has to determine how many futures contracts need to be sold to neutralize changes in bond price. In the gilt trade in Exhibit 5.1, the trader assumed the U.K. gilt 7.25% of 2007 would be delivered against the futures and sold exactly the number of futures that matched the cash position:

$$\begin{aligned}&£10{,}000{,}000 \times 1.0160769 \div £100{,}000 \text{ (the contract size)}\\&= 101.6\text{, or } 102 \text{ contracts}\end{aligned}$$

This is known as factor weighting.

The nominal value of the cash bond position is £10 million. The nominal value of the futures hedge is £10.2 million. The difference between these two nominal amounts is known as the tail. On the delivery date, the holder of the cash bond position will deliver bonds with a nominal value of £10 million, which will be settled at the futures contract's closing price on that day. To eliminate the tail, the trader will simultaneously buy back the two extra contracts at the same settlement price.

In the above example, the basis is traded by buying cash bonds and delivering them against futures. The opposite strategy—selling the bonds and buying the futures contract—is known as a short basis trade,

EXHIBIT 5.2 Short Basis Trade—UKT 7.25% 12/07

Trade Start		Trade End	
Settlement Date:	11/20/98	Delivery Date:	3/31/99
Bond Price	118.13	Forward Bond Price	118.329341
Futures Price:	116.40	Forward Futures Price:	118.271351
Funding Rate:	6.6125%		
Notional Value:	£10,000,000	Net Basis:	0.057999
Conv. Factor:	1.0160769	Profit:	£58,000

Forward Futures Price:	Starting futures price × Conversion factor
Net Basis:	Forward bond price – Forward futures price
Profit:	Profit = (Notional value/100) × Net basis

or going short the basis. If traders know for certain which bond will be the cheapest to deliver against the futures contract, then they know that, as holders of a long futures position, they will receive at least that bond when they take delivery. If they do not receive that bond, they will receive a bond worth more.

Exhibit 5.2 shows what happens if the repo rate assumed in Exhibit 5.1 is altered. In this case, it makes more sense for the trader to sell the 7.25% of 2007 and buy futures. On the delivery date, the trader will receive cash delivery against 100 futures contracts and simultaneously settle the two-lot tail.

Cheapest-to-Deliver

A bond futures contract generally permits the delivery of bonds within a range of maturities, known as the deliverable basket. For example, the futures contract on the U.K. government gilt contract permits the delivery of any coupon-bearing gilt with a maturity of 8.75 to 13 years. Within this basket, the cheapest-to-deliver bond (the CTD) is the bond with the lowest net basis. That is, the price of this bond multiplied by its conversion factor plus the carrying costs to the futures delivery date is lower than that of any of the other bonds in the deliverable basket (including bonds that have not yet been issued).

The futures contract will assume the duration and convexity characteristics of the CTD. In the simplest case, where one bond is definitely the CTD and will remain the CTD under all circumstances, the futures contract is simply a proxy for this bond. If there are two bonds in contention for CTD, the futures contract will behave in a manner proportional to the probability assigned to each bond's becoming the CTD. The more bonds in the deliverable basket, and the closer they are in contention for CTD, the more variable the characteristics of the futures contract. For hedgers, therefore, it is harder to estimate the basis point value of a futures price change when there is more than one bond in contention for CTD.

During the life of a particular futures contract, the CTD can change from one bond to another. More importantly, a change in the CTD will change the relationships between all the bonds in the deliverable basket. There are several market-determined reasons for this and one overriding mathematical one.

Clearly, the shape of the yield curve will have an impact on which bonds are cheapest. If the curve is positively sloped, then longer-maturity bonds will be higher yielding and may tend to be cheaper than shorter-maturity bonds. If the yield curve is inverted, shorter-maturity bonds may tend to be cheaper.

The net basis is more important than the gross basis in determining the CTD. In Exhibit 5.1, the important price is the March 1 price, which is determined by the repo, or funding, rate. In that example, all else equal, the lower the funding rate, the greater the negative net basis. Government obligations are generally funded at what is termed the general collateral rate, which is normally lower than corporate term money (the rate corporations pay to borrow money). For a bond in great demand, the rate will be even lower, and the net basis will be directly affected.

The central banks that issue sovereign debt have different approaches. In some countries (notably France), the attitude has been that the government's funding needs can be best served by a predictable and regular supply across maturities, coupled with a consultative issuance process. In other countries, the attitude towards the market seems almost antagonistic, the *modus operandi* seeming to be to catch participants unawares. Although this latter style has been shown to be less effective for borrowers, it results in an increase in volatility that makes basis trading more attractive.

Induced uncertainty was an important feature of the German market for a long time. In the German 10-year futures market, the deliverable bonds fall in a maturity span of 8.5 to 10.5 years. For a long time, the CTD was always the longest-maturity bond. Because there was no stock of older, even longer-dated bonds that would age into the deliverable basket, the longest-maturity bond would always be the most recent issue. For many expiration periods, then, the game in the German market was to try to determine whether the Bundesbank would issue new bonds in sufficient quantity and in time to be deliverable against the current futures contract. If there was a long period before the current expiration, the possibility of new issues had a high impact on the determination of the CTD. As expiration approached and uncertainties sharpened, the effect on liquidity and hedging could be quite pronounced.

Fluctuations in the repo rate, the yield curve, and the supply picture are all important determinants of the relationships in the deliverable basket. These are all market-driven reasons that can be affected by the trading and hedging quirks of a particular country's market, the general economy of one country or its important trading partners, and the level of transparency fostered by the issuing central bank. These factors are clearly all variable and open to interpretation.

The most important determinant of the basis, however, is almost completely predictable and is mathematically simple. That determinant is known as factor bias.

Factor Bias

When the Chicago Board of Trade (CBOT) developed bond futures contracts in the late 1970s, their frame of reference was agricultural commodities. Agricultural commodities are by their nature not uniform. To be an effective hedging instrument, an agricultural futures contract had to permit the delivery of premium grades and lower grades, which meant there had to be some built-in compensating mechanism that would allow for hedgers to deliver across the range of quality without being penalized.

Faced with a U.S. Treasury market that had a wide range of coupons and maturities, the CBOT's solution was to create a factor for each bond; multiplying each bond in the deliverable basket by its factor homogenizes the bonds eligible for delivery. In the late 1970s, the underlying yield level was close to 8% semiannual. This was the level chosen as the notional yield for the contract.[1] In theory, if the contract was trading at par ($100), then the CTD would be yielding 8% if priced for delivery on the last day of the contract. In order to effect the required homogenization, the other bonds in the basket would also be assumed to yield 8% on a semiannual basis if delivered. Thus the conversion factor for each bond will be a ratio based on the price the bond would trade at if it were to yield 8% on the delivery date.

This method of determining the factor is in use in all deliverable bond futures markets. It is even used in Japan, where the dominant convention is to trade using simple yield. In some markets, the factor is based on the one day on which deliveries are permitted; in others, it is based on the last day of the month. Some markets use a semiannual convention, while others adopt their own domestic convention, such as the annual yields used in Europe. However, in all markets, the factor bias effect is observable.

EXHIBIT 5.3 Factor Bias

Bond I:		Bond II:	
Settle Date:	1/4/99	Settle Date:	1/4/99
Yield:	7.50%	Yield:	7.50%
Coupon:	6.25%	Coupon:	12.00%
Maturity:	1/1/02	Maturity:	1/1/02
Price:	97.00	Price:	111.8500
Bond I:		**Bond II:**	
Settle Date:	1/4/99	Settle Date:	1/4/99
Yield:	4.50%	Yield:	4.50%
Coupon:	6.25%	Coupon:	12.00%
Maturity:	1/1/02	Maturity:	1/1/02
Price:	104.90	Price:	120.5000
Price Change:	7.90	Price Change:	8.65
% Price Change:	8.14%	% Price Change:	7.73%

The conversion factor method homogenizes the deliverable bonds when the futures contract is trading at 100 (the notional yield of the contract); the further away from par the market moves, whether up or down, the less effective homogenization becomes. This is because the factor method establishes a fixed ratio between each pair of bonds in the basket, but, as bond prices rise, the price of a high-coupon bond will change proportionately less than the price of a lower-coupon bond of the same maturity. As bond prices fall, the opposite occurs. Because the fixed factor ratio does not change with price, it has the effect of artificially cheapening shorter-duration bonds in a rally and longer-duration bonds in a decline.

Exhibit 5.3 illustrates factor bias arithmetically, using two Italian bonds, both due on January 1, 2002, one with a 6.25% coupon and the other with a 12% coupon. When prices rise, the higher-coupon bond rises proportionately less in price, thus becoming cheap relative to the other bonds in the deliverable basket. The opposite occurs when prices fall.

Of course, rarely do the bonds in a deliverable basket have the same maturities but different coupons. In most cases, there is a mix of coupons and maturities. A bond's maturity—or, more correctly, its duration (the weighted average maturity of the bond's cash flows)—also determines the effect of market price changes on the bond's relative cheapness. Shorter-duration bonds will tend to be cheaper in a rallying market. Exhibit 5.4 provides an example based on the German government five-year bond futures contract on the Eurex in December 1998. The 8% of July 2002 has a lower duration than the 4.5% of August 2002; therefore, it becomes CTD as yields fall.

The "quality option" noted in the table is a measure of the amount that investors who are short the futures contract would be willing to pay for the option, or the choice, of deciding which bond to deliver. For example, according to the data in the table, a trader long the 4.5% of August 2002 and short the futures contract can gain by delivering the 8% of July 2002 if the market rallies. The value of the quality option is calculated by a model that takes into account the probability of delivery for each bond in the deliverable basket. The last column in the exhibit gives the probability of delivery of the current CTD.

EXHIBIT 5.4

DTB: OBL 5 YR (OBZ8)

Delivery Date	Trade Date	Horizon	Futures Price
12/10/98	10/14/98	11/23/98	103.85

Shift Direction	Yield Change	Futures Price	CTD Price	Quality Option	CTD Bond		CTD Probability
Down	–90	106.839	106.84	0.00	8%	7/2002	100.00%
Down	–80	106.500	106.50	0.00	8%	7/2002	100.0%
Down	–70	106.162	106.16	0.00	8%	7/2002	99.6%
Down	–60	105.826	105.85	0.02	8%	7/2002	98.2%
Down	–50	105.491	105.55	0.06	8%	7/2002	97.2%
Down	–40	105.157	105.28	0.13	8%	7/2002	95.1%
Down	–30	104.823	105.06	0.24	8%	7/2002	91.9%
Down	–20	104.491	104.91	0.42	8%	7/2002	87.4%
Down	–10	104.159	104.85	0.69	8%	7/2002	81.4%
UNCH	0	103.828	104.90	1.08	8%	7/2002	73.9%
Up	10	103.496	105.10	1.60	8%	7/2002	65.0%
Up	20	103.164	105.46	2.29	8%	7/2002	55.2%
Up	30	102.832	105.22	2.39	4.5%	8/2002	54.7%
Up	40	102.500	104.17	1.67	4.5%	8/2002	63.7%
Up	50	102.167	103.32	1.15	4.5%	8/2002	71.4%
Up	60	101.833	102.65	0.82	4.5%	8/2002	77.6%
Up	70	101.500	102.19	0.69	4.5%	8/2002	81.3%
Up	80	101.165	101.91	0.75	4.5%	8/2002	82.4%

EXHIBIT 5.5 DTB 5 Year: OBZ98

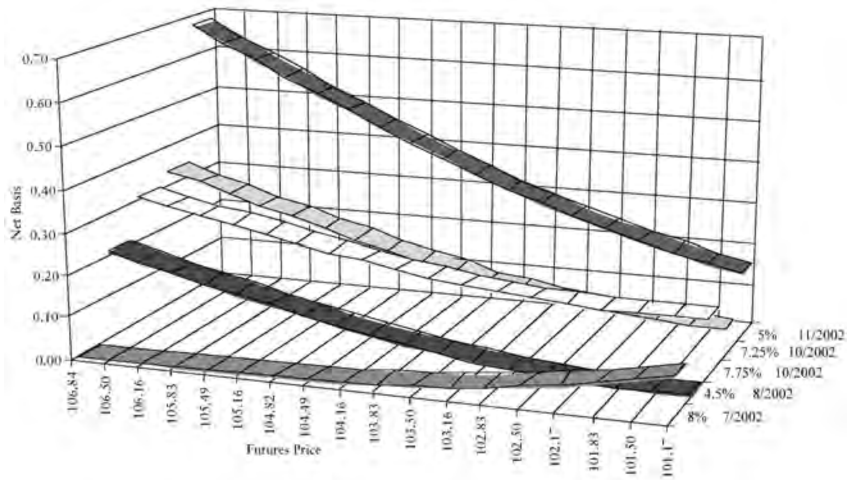


Exhibit 5.5 illustrates the operation of factor bias graphically, using the information in Exhibit 5.4. The CTD, the bond with the lowest net basis, is the 8% of July 2002 when the market is above a price of 102.83, but the CTD changes to the 4.5% of August 2002 as market prices fall. Note not only the change in CTD, but the relative changes in the net bases of all the bonds in the basket, some quite extreme. Bear in mind that these changes occur simply because of factor bias; this example assumes no changes in supply, in the yield curve, or in the repo rate.

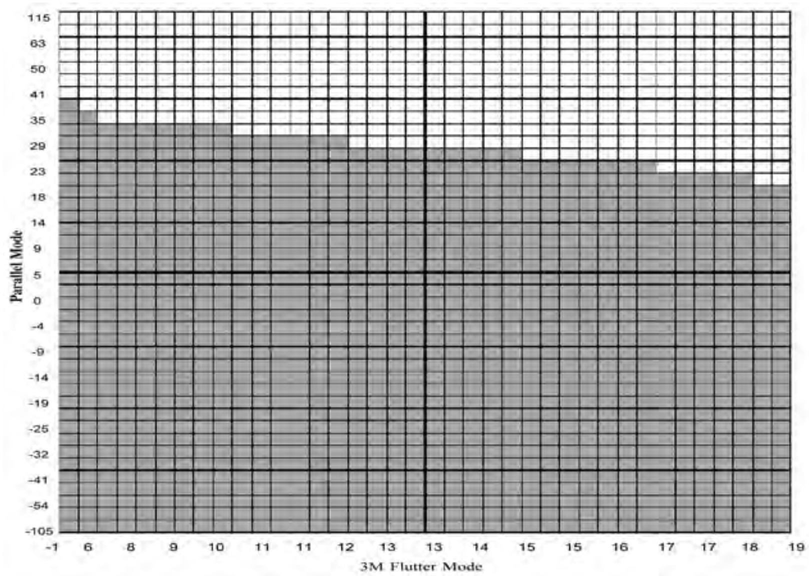
Exhibit 5.6, based on information from Exhibit 5.4, shows how a change in CTD can affect the value of a basis trade consisting of a long futures position and a short cash bond position. Assume the German five-year futures contract is trading at 103.85. At this price, the CTD is the 8% of July 2002. Hedging this bond requires a futures position of 42 contracts. Now assume the bond market rallies and the futures price rises to 105.22. The CTD now becomes the 4.5% of August 2002. Hedging this shorter-duration bond requires a futures position of just 38 contracts. The trader will gain by liquidating the futures contracts in a rising market.

In the above examples, the change in CTD is mathematically predictable from a change in one factor—the price level. Changes in supply, variability in the repo rate, and changes in the yield curve were not considered. Yet it stretches probability to assume that market prices can change substantially without some underlying change in either the repo rate, the shape of the yield curve, or even issuance patterns. Introducing

EXHIBIT 5.6 **Duration Hedging**

Bond I:		**Bond II:**	
Notional Value:	10,000,000 DM	Notional Value:	10,000,000 DM
Bond Issue:	Dbr	Bond Issue:	Obl #124
Bond Coupon:	8.00%	Bond Coupon:	4.50%
Bond Maturity:	7/22/02	Bond Maturity:	8/19/02
Bond Price:	110.9540	Bond Price:	99.0550
Yield:	4.74%	Yield:	4.71%
Duration:	3.3039	Duration:	3.2500
dv01:	0.03634	dv01:	0.03456
Factor:	1.062248	Factor:	0.951617
Futures Factor Weight:	42	Futures Factor Weight:	38

EXHIBIT 5.7 **CTD Transition Diagram**



and weighing the effects of these other variables is complicated and time-consuming, but rewarding.

Exhibit 5.7 modifies the situation illustrated in Exhibits 5.4, 5.5, and 5.6 by introducing changes in the yield curve. The meeting point of the two bold lines in the center of the grid represents the market's current level. The vertical axis represents changes in price as a result of a parallel yield shift. The horizontal line plots changes in the slope of the yield curve. The change in the slope of the yield curve is an expression of the rate at which the yield of one bond would move relative to another.

The slope of the yield curve can be measured by regressing the historical yields of two bonds with respect to each other. Exhibit 5.7 employs a proprietary model that develops a parameter that summarizes the change in slope of the curve. This parameter, called the "3M Flutter Mode," is plotted on the horizontal axis.

The darker area in Exhibit 5.7 represents the combinations of parallel shift and change in slope of the yield curve that would preserve the current CTD. The lighter area represents the combinations that would change the CTD. The diagram indicates that a shift in the CTD takes place sooner when the yield curve is steepening and bond yields are rising.

The above somewhat simplified examples show how changes in the repo rate, changes in the shape of the yield curve, and changes in price level all interact to create opportunities for basis trading. A basis trader can benefit from price changes and from changes in the yield curve; the trader is said to own "optionality" on both. The basis trade fits the narrow definition of market neutral, because it is not adversely affected by general market movements. All the variables important in basis trading are also important when using futures for any purpose, be it narrowly defined market neutral trades, cross-country trades, equity-related trades, or simple directional bets.

Counterparty and Market Failure

While basis trades may be immune to general market movements, they are not riskless. One concern with futures contracts that require delivery on a single expiration date is the failure by repo counterparties to honor a delivery. This is less of a problem in the gilt market, which allows delivery on any day during the delivery month. Nevertheless, the most extreme example of this risk actually occurred in the gilt market in March 1998. That crisis provides a good illustration of the day-to-day risks of basis trading.

Under the old *modus operandi*, if a gilt went "special ex-dividend" during a delivery month, it became undeliverable for the remainder of that month. In March 1998, the 9% of 2008 was deliverable until March 9, on which date it went special ex and became undeliverable. The next cheapest bond was the 8% of 2009, which was trading more than a point richer relative to the futures contract than the 9% 2008.

Consider a trader who had bought the 9% 2008, and funded it to the first week of March, intending to deliver it against the futures contract. Now imagine that the trader's repo counterparty to the financing trade, which was due to return the bonds on a date no later than March 9, failed to do so. The trader would have been forced either to replace the 9% 2008 with the 8% 2009 in order to effect delivery, or to buy back the futures contract at a loss of one point or more. It is unlikely that the trader would have chosen simply to fail on the futures contract, given the severity of the associated financial and regulatory penalties.

In most cases, fails arising from settlement mishaps, although inconvenient, do not create major problems. For one thing, they usually do not last for more than a day or two, at least in G-10 government bond markets. Meanwhile, the bondholder being "failed to" earns the coupon on the bond while not having to pay the principal, thus enjoying an economic advantage. Nor is the bondholder usually at risk of losing the principal, as the Euroclear system will not release funds unless a bond delivery is confirmed. If a bond is cleared through Euroclear, the convention is that the trader being failed to can buy in the bond at an appropriate price after seven days of failure.

In March 1998, however, this convention did not apply to gilts, as they are cleared through the Central Gilts Office, which had no uniform buy-in provision. The holder of a funded long position in the 9% 2008 could conceivably have been failed to for a long period of time. While earning a daily income from the coupon, the trader would have faced a much greater loss from having to satisfy the short futures position without being able to buy in the bond from the defaulting party.

What resolved the dilemma was prompt action by the U.K. Debt Management Office (DMO). The DMO realized that, while there was no specific buy-in provision in the gilt market, many of the repo funding trades involved were governed by bilateral agreements, most of which were modeled on the template provided by the International Securities Markets Association (ISMA). Many of these agreements had been amended to provide for default events such as an extended failure. These would have allowed for forced closing out of positions, not just in the gilt market, but in all markets in which the two counterparties to each agreement held positions.

With signs of eroding trust in the repo market and drying up of trading liquidity, the DMO recognized the potential for a systemic mess and responded in an effective, market-oriented fashion. They announced they would make available extra tranches of the 9% 2008 in the repo market at a zero funding rate, eliminating the prospect of traders failing to deliver that bond against outstanding futures positions. In the end, no fails occurred, the DMO was never required to lend bonds, and the squeeze disappeared.

This rather extended example of a squeeze was chosen because it illustrates some of the risks associated with a market neutral trading strategy. Participants in such strategies must:

- Know the local rules, regulations, and customs. It was news to some participants that there was no clear buy-in convention in the United Kindom.
- Realize that a no-brainer trade such as a cash-and-carry basis trade is not without risk.
- Recognize that international agreement templates such as those of the ISMA and its swap market parallel, the International Swaps and Derivatives Association (ISDA), while fine operating guides, must be supplemented by sound legal and market understanding.
- Understand the nature of bilateral covenants that supersede local market custom. For the "squeezers" in the gilt market in March 1998, a literal interpretation of market rules was not enough.
- Know the extent to which governing authorities support the smooth functioning of their markets.

The precise situation in the gilt market in March 1998 will not recur because the special ex provision has been discarded. However, in markets that permit delivery of bonds on only one day of the month (as do most European bond futures markets), threatened failure is all too common. Since the gilt event, every expiration of a European bond futures contract has been priced to make some allowance for a potential failure, dragging the bonds ranked second or third to the CTD closer to the level of the CTD. This will continue until the delivery rules are amended, the buy-in provisions altered, or futures failure rules amended.

More general market failures are also a concern. The G-10 fixed-income market has enjoyed a long period without systemic disruption. The failure of Barings in 1995 merely caused a mild chill. The huge losses sustained by many banks in the emerging-market crisis and the Long-Term Capital Management debacle were prevented from becoming systemic problems by concerted and well informed central bank action. This does not mean that markets will never fail. And certainly the events in late 1998 indicate that markets can falter to the extent that it becomes difficult to execute trades.

In the late summer and fall of 1998, concern about trader viability reduced willingness to trade the basis in all the sovereign markets. Traders became concerned that, in making delivery, they would effectively exceed one-day value limits with their clearing brokers. In December 1998, Japanese government bond futures contracts failed to arrive at a closing price for several days in a row, and the electronic trading system failed to function. This failure caused substantial mark-to-market misalignment with dislocations in profit and loss reporting and cash flows.

Margin and Cash Flows

Traders have historically attached an inordinate amount of prestige to the level of their credit line—how high their loss on a trade can go before an ISMA agreement, say, calls for margin. But futures markets require variation margin on a daily basis. This can create problems for a basis trader who is long the cash bond and short the futures contract.

The futures position will be marked to market every day, so the trader faces a potential margin call each trading day. At the same time, the trader may have funded the cash bond position with an ISMA counterparty that has a high margin threshold. While waiting to be able to call for margin from the repo counterparty, the basis trader can wind up using a lot of capital to meet variation margin on the futures contract.

One sensible approach is to set margin thresholds close to zero. This may require more active cash management and operational resources, but it prevents a potentially calamitous capital drain.

Initial margin requirements can also create problems. The level of initial margin required to trade futures has remained relatively steady for the last few years, in the 1% to 2% area. For many participants, ISMA-governed repo trading in G-10 markets required no initial margin. Judging from the history of commodities markets, however, exchanges and regulators are prone to respond to market crises by drastically increasing initial margin levels and to disruptive squeezes by restricting the kinds of trading that can be done.

In the crisis of the fall of 1998, many firms sharply increased their margin requirements for trading repos and swaps governed by ISMA and ISDA agreements, in some cases from zero to 3% or more for G-10 government bonds and far more for emerging-market debt. The increased margin requirement proved particularly harmful to institutions that employed excessive amounts of leverage, as they were forced to reduce positions immediately. For example, with an increase in the margin requirement from 1% to 4%, a firm leveraged by 30-to-1 would have to reduce positions to a level that would satisfy a leverage level of about 25-to-1.

Leverage levels are a limited indicator of risk. They do not address qualitative issues such as a portfolio's duration mismatches or its credit risk. Nevertheless, leverage levels do give an indication of a trader's exposure to a potential margin call, and the downside that such a call might create.

On the surface, basis trading appears to be a simple strategy. Much of the time it is. An effective basis strategy, however, requires sound understanding of the hedging issues, effective agreements and relationships with counterparties, operational competence, and a detailed understanding of the many risks involved.

SWAPS

Another market neutral strategy for government bonds involves trading the bonds against interest rate swaps. At the simplest level, a trade between a government bond and an interest rate swap in the same currency is a credit spread trade. A bond pays principal and coupon, and its price reflects the present value of its cash flows through to redemption. A plain vanilla asset swap traded against a government bond would match the bond's coupon flows, but would not provide a payment of principal at either the outset or the conclusion of the swap.

Exhibit 5.8 provides an example. On January 4, 1999, the trader borrows to buy the 6% 2007 German bond and enters into a swap to pay a fixed rate of 6% on a notional value of 10 million DM in return for receiving a floating rate on the same notional amount plus an upfront payment of 1,388,000 DM. Assuming the upfront payment can be invested at EURIBOR (3.2%), the trader receives interest of 45,032.89 DM by the end of the first year. Also, on January 4, 2000, the trader receives a floating rate payment of 324,444.44 DM (calculated as the floating rate of 3.2% times the notional amount of 10 million DM times the holding period, 365/360).

EXHIBIT 5.8 **Interest Rate Swap versus Government Bond**

Bond:		**Swap:**	
Start Date:	1/4/99	Start Date:	1/4/99
Bond Type:	German Govt.	Asset Swap Type:	Par-Par
Bond Coupon:	6.00%	Pay Fixed Rate:	6.00%
Bond Maturity:	1/4/07	Swap Maturity:	1/4/07
Notional Value:	10,000,000 DM	Fixed Notional:	10,000,000 DM
Bond Price	113.88	Receive Float Rate:	*12 month EURIBOR
Starting Invoice:	11,388,000 DM	Floating Notional:	10,000,000 DM
Funding Rate:	2.5000%	Upfront Receipt:	1,388,000 DM
Funding End Date:	1/4/00	Swap Yield:	4.1430%
Yield to Maturity:	3.9430%		

*12 month EURIBOR = 3.2%.

The trader pays 288,654.17 DM to fund the bond (equal to the funding rate of 2.5% times the amount invoiced of 11.388 million DM times the holding period, 365/360). The trader also makes a fixed payment on the swap of 600,000 DM (the 6% fixed rate times the notional 10 million DM times 365/365). The amount of this payment is fully offset by the amount the trader receives from the coupon on the bond. The trader thus enjoys a net inflow of 80,823.16 DM (324,444.44 + 45,032.89 – 288,654.17), which represents the positive carry for the trade.

While this example simplifies normal operating reality, it serves to illustrate the two main features of the bond-swap trade. The difference between the EURIBOR rate and the bond repo rate is 70 basis points (3.2% – 2.5%), and the spread in yield between the swap and the government bond in the example is 20 basis points (4.143% – 3.943%). Thus, with the EURIBOR rate being 70 basis points higher than the repo rate, the trade has a positive carry of 70 basis points for the first year. In addition, the trader gains if the swap–bond spread widens. At the same time, the trader's risk of loss is limited because the likelihood of German government rates exceeding swap rates is small.

Exhibit 5.9 shows the spreads of asset swaps in the German government market at the beginning of January 1999, and Exhibit 5.10 plots these graphically. Clearly, the longer the maturity of the bond, the wider the credit spread. Exhibit 5.11 shows what the same curve looked like in August 1998, when credit markets were in turmoil. Spreads were generally much wider then, although the curve was smoother.

EXHIBIT 5.9 **Swap Spreads for German Government Bonds (1/4/99)**

Description	Maturity	Coupon	Swap Spreads
OBL 114	15 MAR 2000	6.500%	–13.0
OBL 115	15 MAY 2000	5.875%	–11.9
BUND	22 MAY 2000	8.750%	–10.1
UNITY	20 JUL 2000	8.750%	–10.8
BUND	21 AUG 2000	8.500%	–10.3
OBL116	22 AUG 2000	5.750%	–11.3
BUND	20 OCT 2000	9.000%	–8.6
OBL 117	21 NOV 2000	5.125%	–14.0
BUND	20 DEC 2000	8.875%	–12.9
BUND	22 JAN 2001	9.000%	–8.1
BUND	20 FEB 2001	8.500%	–7.1
OBL 118	21 FEB 2001	5.250%	–14.9
BUND	21 MAY 2001	8.375%	–11.8
OBL 119	21 MAY 2001	5.000%	–20.2

EXHIBIT 5.9 (Continued)

Description	Maturity	Coupon	Swap Spreads
OBL 120	20 AUG 2001	5.000%	–15.6
UNITY	20 AUG 2001	8.750%	–9.2
BUND	20 SEP 2001	8.250%	–10.1
OBL 121	20 NOV 2001	4.750%	–14.5
UNITY	21 JAN 2002	8.000%	–6.9
OBL 122	22 FEB 2002	4.500%	–10.9
OBL 123	17 MAY 2002	4.500%	–7.2
BUND	22 JUL 2002	8.000%	–9.0
OBL 124	19 AUG 2002	4.500%	–12.8
TREUHAND	01 OCT 2002	7.750%	–15.0
BUND	21 OCT 2002	7.250%	–13.0
OBL 125	12 NOV 2002	5.000%	–15.8
TREUHAND	02 DEC 2002	7.375%	–9.7
BUND	20 DEC 2002	7.125%	–12.8
TREUHAND	29 JAN 2003	7.125%	–10.9
OBL 126	18 FEB 2003	4.500%	–18.4
BUND	22 APR 2003	6.750%	–17.5
TREUHAND	23 APR 2003	6.500%	–11.7
OBL 127	19 MAY 2003	4.500%	–20.8
TREUHAND	11 JUN 2003	6.875%	–11.6
TREUHAND	09 JUL 2003	6.625%	–13.1
BUND	15 JUL 2003	6.500%	–15.3
OBL 128	26 AUG 2003	3.750%	–24.3
BUND	15 SEP 2003	6.000%	–23.2
TREUHAND	12 NOV 2003	6.000%	–17.4
TREUHAND	04 MAR 2004	6.250%	–17.0
TREUHAND	13 MAY 2004	6.750%	–16.3
BUND	15 JUL 2004	6.750%	–18.4
TREUHAND	09 SEP 2004	7.500%	–16.6
BUND	11 NOV 2004	7.500%	–18.7
BUND	03 JAN 2005	7.375%	–15.1
BUND	12 MAY 2005	6.875%	–16.3
BUND	14 OCT 2005	6.500%	–19.7
BUND	05 JAN 2006	6.000%	–17.5
BUND	16 FEB 2006	6.000%	–19.5
BUND	26 APR 2006	6.250%	–23.3
BUND	04 JAN 2007	6.000%	–21.2
BUND	04 JUL 2007	6.000%	–24.3
BUND	04 JAN 2008	5.250%	–37.6
BUND	04 JUL 2008	4.750%	–42.1

EXHIBIT 5.10 Swap Spreads for German Government Bonds (1/4/99)

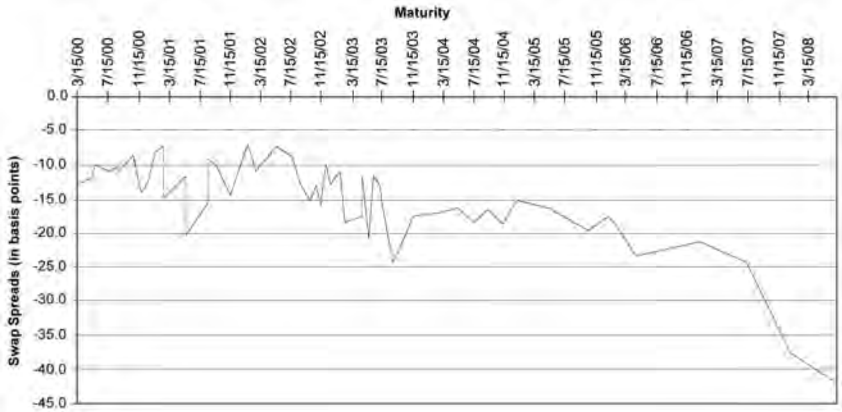
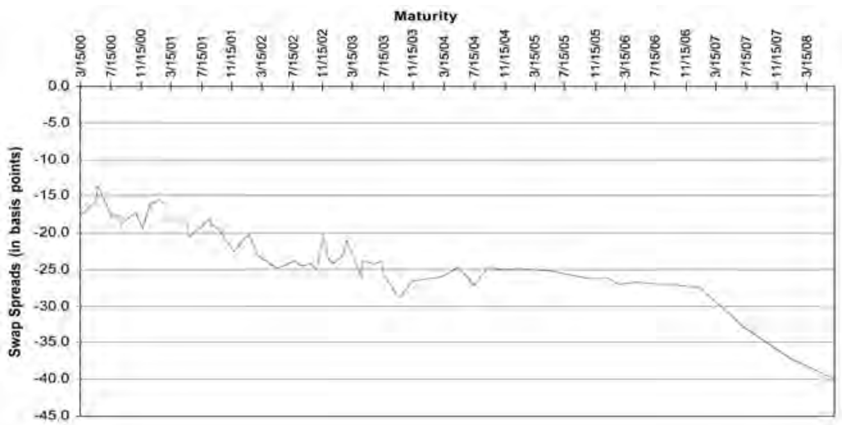


EXHIBIT 5.11 Swap Spreads for German Government Bonds (8/14/98)



What determines the swap spread? A major determinant is the creditworthiness of the government involved compared with that of the banks that comprise the swap market. At this writing, there are very few AAA-rated banks, while the German government is rated AAA. Swap rates will also reflect the rates at which banks will trade short-term money (as the swap does not involve payment of principal). The shape of the swap yield curve thus reflects expectations of the spread between bond levels and bank funding levels and credit judgments about the longer-term spread.

If these were the only criteria, we would expect the swap spread curve to slope gradually and linearly. Clearly this is not the case. The variability of the swap spread curve, or the credit curve, is dictated by the richness or cheapness, or sector bias, of the underlying bond market. The swap trader must thus make macrojudgments about the relative creditworthiness of government and bank debt and also microjudgments about the particular bond or sector being bought or sold against the swap.

Macroconsiderations

On the face of it, any G-10 government would seem to be a superior credit to any bank. Banks are in a constant state of flux, migrating between different credit rating levels and frequently under credit watch. Governments have the ability to impose taxes to fund their debt. But governments are not impervious to mistakes. They may introduce withholding taxes that effectively raise their borrowing costs higher than their tax receipts, requiring them to fund at higher rates than their own banks. Government bonds also require the repayment of principal, while swaps do not. The government's ability to print money may be the best argument for favoring sovereign debt over bank debt, if for no other reason than principal repayment is all but assured. (The European Monetary System may restrict that ability but will in no way eliminate it.) However, it is still possible for governments and banks to delay payments and reschedule debt.

History, which is normally the clearest guide to how these spreads will trade over time, is inconclusive. The early part of the 1995–1998 period was marked by shrinking credit spreads. Investors' complacency dulled their perception of risks. Government bonds in many European countries traded at small yield discounts to the swap market. At the lower end of the G-10 credit spectrum, Italian bonds actually traded at a premium to swaps (although the premium began to disappear when Italy canceled its withholding tax).

When the Southeast Asia crisis began in the summer of 1997, bond prices increased modestly and spreads widened (Exhibit 5.12). When the Russian crisis hit in the summer of 1998, G-10 bond prices increased sharply. During the fall of 1998, spreads for U.K. government bonds stayed very high, in part because of a lack of issuance (Exhibit 5.13).

However, while the Russian debt crisis was roiling markets, the Long-Term Capital Management (LTCM) debacle also broke, putting additional pressure on the banking industry. The prices of certain European government bonds fell drastically and some began trading at a premium to the swap market. This was true not only in Italy, where the market had only recently been weaned from high positive spreads, but also in countries like

EXHIBIT 5.12 Swap Spreads for the 10-Year German Government Bond (6% 1/07) from the Start of the Asian Crisis in 1997

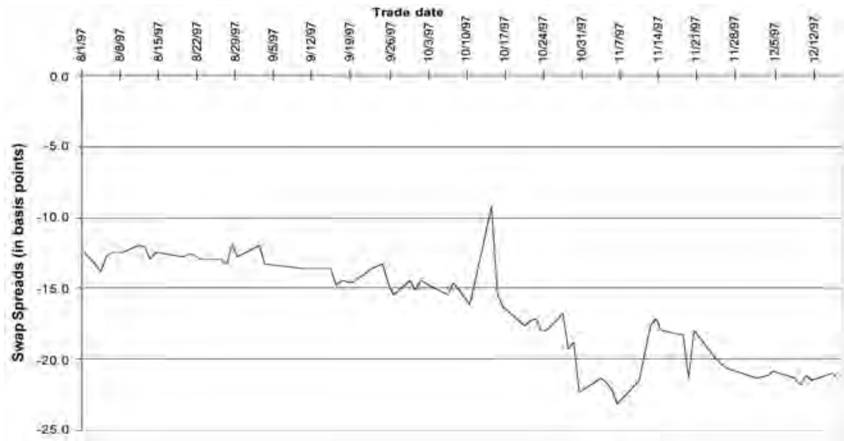


EXHIBIT 5.13 Historical Swap Spreads for U.K. Government Bonds (9- to 12-year maturity)

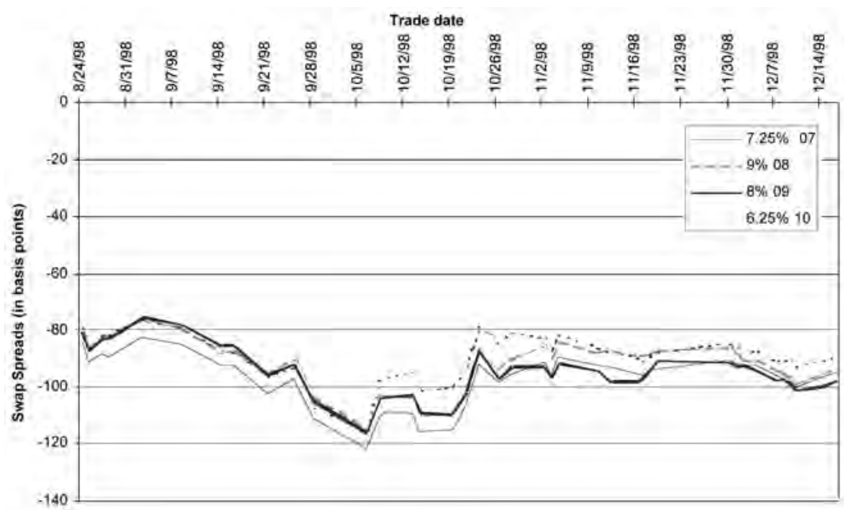
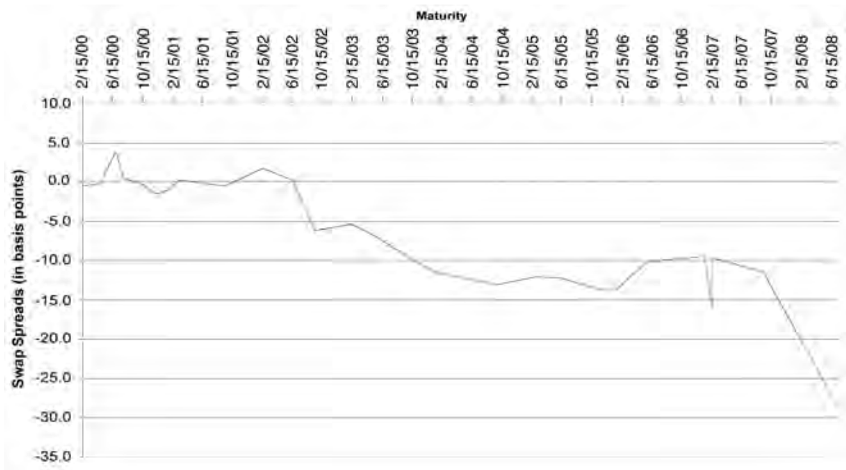


EXHIBIT 5.14 Swap Spreads for Dutch Government Bonds on 11/1/98



the Netherlands, which had been fiscally exemplary and probably one of the best credits available anywhere (Exhibit 5.14).

This unusual behavior represented a liquidity crunch. LTCM and other hedge funds and proprietary trading desks had held extremely sizable long positions in government bonds, and had hedged these with swaps (the supposedly correct strategy in a credit crisis). Many of these positions, however, had been over-leveraged, and had to be reduced at a time when the banking industry was incapable of absorbing them. The demand for liquidity obstructed the normal flow of bonds to end investors.

The macroconcerns of swaps trading are simple enough. How worried are investors about the state of the credit markets? Which way is the balance tilting in the credit scales? The greater the concern, the more likely the scales will tilt in favor of government debt. In practice, however, the considerations turn out not to be so simple.

Microconsiderations

The swap curve is relatively smooth and unaffected by issuance schedules and tax or repo considerations. The bond market curve is much more variegated and internally volatile. This can create problems for bond traders who seek to gain by selling rich bonds and buying cheap ones. Subsequent changes in the yield curve can swamp any profits available from current mispricings.

The trader can use swaps to reduce the risk of bond trading. For example, swap spreads can be traded to take advantage of an expected change in issuance, or a cheapness to the curve in one sector of the government market that is offset by richness elsewhere. Or they can be used to inventory bonds that are currently fairly priced relative to the curve, but that have the potential to become richer by becoming part of a futures deliverable basket.

Exhibit 5.9 showed the German yield curve in early 1999. The bonds in deliverable baskets, especially the CTD, are expensive. The then-new 10-year bond is very rich, being the most liquid long-duration bond. The high-coupon bonds, by contrast, tend to trade cheaply (a reflection of tax anomalies), and the Treuhand and Unity bonds, both full faith and credit of the German government, trade marginally cheaper than regular bonds because of their historical associations. In this kind of yield environment, investors can find many opportunities to take advantage of anomalous pricing, while using the swap market to reduce yield curve risk.

A striking example is provided by the Spanish market in the second half of 1998. The new Spanish 10-year bond, the 5.15% of 2009, was introduced in a very illiquid environment. Being the first tranche, it was not of sufficient size to become the benchmark. Furthermore, new bonds in the Spanish market trade without accrued interest until one year before their first coupon, a period that can be as long as six months. This combination of circumstances offered a chance for profitable arbitrage.

Exhibit 5.15 shows the arbitrage trade. It calls for buying the 5.15% 2009 on a duration-weighted basis against the 7.35% of 2007, an old benchmark that was still rich, and offsetting the yield curve risk with a swap. In times of normal liquidity, the trader would have hedged the maturity difference on the bonds with a swap that commenced on the maturity date of the shorter bond, March 31, 2007, and ended on the maturity date of the longer bond, July 30, 2009, a so called "forward-forward" swap. In the illiquid environment of the time, it would have been more economical to effect two swaps that matched and offset the full remaining tenor of the two bonds.

The initial spread between the 5.15% bond and the swap was 14.4 basis points (4.994% – 5.138%), while the initial spread for the 7.35% bond and swap was 11 basis points (4.858% – 4.968%). By the time the trade was liquidated, the spread for the 5.15% had widened to 21.4 basis points (4.031% – 4.245%), while the spread for the 7.35% had stayed at 11 basis points (4.858% – 4.968%). Put another way, the difference between the two swap spreads, initially 3.4 basis points (14.4 – 11.0), had, by the end of the trade, widened favorably to 10.4 basis points (21.4 – 11.0), for a net gain of 7 basis points (10.4 – 3.4). Using the average *present values* of the two bonds, this equates to 5,810,000 Spanish pesetas. (With three-month LIBOR at approximately 4.35%, the carry for the trade is negligible.)

EXHIBIT 5.15 **Relative Interest Rate Swaps**

Bond I:		**Bond II:**	
Transaction:	Purchase	Transaction:	Sale
Start Date:	7/27/98	Start Date:	7/27/98
Bond Type:	Spanish Govt.	Bond Type:	Spanish Govt.
Bond Coupon:	5.15%	Bond Coupon:	7.35%
Bond Maturity:	7/30/09	Bond Maturity:	3/31/07
Notional Value:	1,000,000,000 pts	Notional Value:	1,127,000,000 pts
Bond Price	96.50	Bond Price	117.30
Funding Rate:	4.3500%	Funding Rate:	4.3500%
Forward Date:	11/30/98	Forward Date:	11/30/98
Forward Price:	97.98	Forward Price:	116.70
Forward Yield:	4.9940%	Forward Yield:	4.8580%
Basis Point Value:	0.089	Basis Point Value:	0.077
Swap I:		**Swap II:**	
Start Date:	7/27/98	Start Date:	7/27/98
Asset Swap Type:	Par-Par	Asset Swap Type:	Par-Par
Pay Fixed Rate:	5.15%	Received Fixed Rate:	7.35%
Swap Maturity:	7/30/09	Swap Maturity:	3/31/07
Fixed Notional:	1,000,000,000 pts	Fixed Notional:	1,127,000,000 pts
Received Float Rate:	*3 month LIBOR	Pay Float Rate:	*3 month LIBOR
Floating Notional:	1,000,000,000 pts	Floating Notional:	1,127,000,000 pts
Forward Swap Yield:	5.1380%	Forward Swap Yield:	4.9680%

*3 month EURIBOR = 4.35%

Spread Analysis	
Net Forward Bond Spread:	4.994% – 4.858% = 0.136% or 13.6 bps
Net Forward Swap Spread:	5.138% – 4.968% = 0.170% or 17.0 bps
Net Spread:	0.034 or 3.4 bps
Sell Bond 5.15% 7/09 vs. Swap	Bond Price: 106.77/Bond Yield: 4.031%/Swap Yield: 4.245%
Buy Bond 7.35% 3/07 vs. Swap	Bond Price: 123.6/Bond Yield: 3.925% /Swap Yield: 4.035%
Net Bond Spread:	4.031% – 3.925% = 0.106% or 10.6 bps
Net Forward Swap Spread:	4.245% – 4.035% = 0.210% or 21.0 bps
Net Spread:	0.104 or 10.4 bps

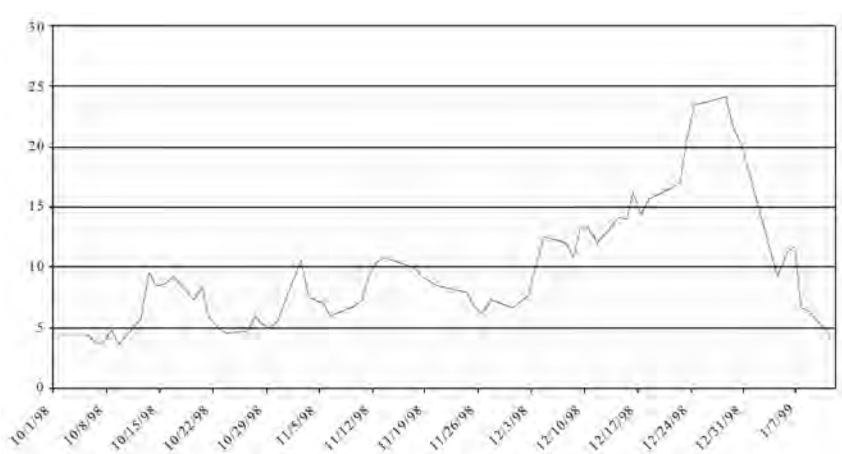
In practice, these kinds of trades require substantial liquidity in the bond, swap, and repo markets. Swap market participants will claim that liquidity is on a par with bond market liquidity. Even in the G-10 markets, however, this is far from being the case. And, of course, liquidity is especially likely to dry up in markets undergoing extreme stress.

TRADING BETWEEN COUNTRIES

Cross-country trading has not, until now, been considered to fall within a narrow definition of market neutral. With the advent of the euro, however, it is now possible to trade between countries with almost no currency risk. Even though the countries are members of a currency union, and are reasonably close in creditworthiness, their bonds exhibit striking variability. Differences reflect different fiscal regimes, bankruptcy codes, tax treatment of repo, and investor preferences.

Exhibit 5.16 illustrates one example of an extreme situation. The Spanish two-year benchmark (Spain is rated AA) traded at a yield discount to the Dutch off-the-run two-year bond (the Netherlands is rated AAA). The Netherlands debt market was still recuperating from the liquidity drought of late 1998, and the Spanish market was and still is characterized by strong domestic investor preference for Spanish debt, even post euro. The history of this pair of bonds shows that, in October 1998, when one would normally have expected the superior credit to trade at a premium, the Spanish bond was trading within a narrow

EXHIBIT 5.16 Yield Spread: Netherlands 1/01 versus Spanish 1/01



range of the Dutch bond. Over the next several months, the richness of the Spanish bond increased, forcing out earlier arbitrage trades. The situation did not resolve itself until the middle of January 1999.

As the European debt markets become accustomed to the euro, the opportunities in credit spreads will likely increase. While the currency risk associated with this trade is almost negligible, there remains the chance that the euro will come unglued and that there might be a reversion to the former native currencies. As time goes on and the euro gains greater acceptance, this scenario clearly becomes less likely.

CONCLUSION

The brief overview provided in this chapter cannot address all the complex issues involved in even the basic trades described. What is clear is that the types of market neutral strategies discussed—basis trading, swap spread trading, and intercountry trading—are all related. They require a high level of leverage and, consequently, a great deal of execution and operational capability. They require solid legal expertise and sound credit assessment, as well as a thorough understanding of and intelligence about the quirks of different countries and their markets.

NOTES

[1] In March 2000, the underlying coupon on U.S. Treasury futures was changed from 8% to 6% to reflect the lower rate environment and to preserve the optionality of the contract.

CHAPTER 6

Market Neutral Strategies with Mortgage-Backed Securities

George E. Hall
President
Clinton Group, Inc.

Seth C. Fischoff, CFA

A market neutral trading strategy may appeal to many investors, as it can offer an attractive return profile under varying market conditions. What is required is a manager able to exploit inefficiencies within and between markets so as to achieve a positive return. As with any strategy, execution determines success. Many strategies that "look good on paper" can place excessive demands on manager expertise.

The return of any investment can be broken down into beta (market) and alpha (security-specific) returns. Beta returns can be easily attained through the use of such instruments as futures or index-linked notes. Alpha returns require a much more analytical approach and are not easily obtained. A market neutral manager aims to achieve alpha by purchasing undervalued cash flows and hedging out their beta. Any incremental returns represent a positive alpha.

This outperformance can be transported to an asset class different from the asset class in which the inefficiencies were detected. Consequently, market neutral managers are not confined to a specific asset class. This chapter focuses on detecting and exploiting inefficiencies in the market for mortgage-backed securities and on constructing from these securities market neutral portfolios that can provide a return increment over simple floating- or adjustable-rate instruments or cash equivalents, while offering a similar risk profile. Quantitative techniques are used to detect underpriced securities and hedging is employed to immunize a portfolio of such securities against changes in interest rates.

Constructing a portfolio of underpriced collateralized mortgage obligations (CMOs) and locking in returns through hedging requires application of theoretical concepts such as duration, convexity, and option-adjusted spreads. This chapter examines the practical applications and problems associated with such techniques. Our analysis sidesteps the issue of credit risk by focusing on bonds of equal credit quality. As the majority of CMOs are issued by Fannie Mae (FNMA, the Federal National Mortgage Association) and Freddie Mac (FHLMC, the Federal Home Loan Mortgage Corporation), which are viewed as AAA, credit risk is generally not a problem. Nevertheless, readers should note that application of the analysis to CMOs rated below AAA would require an adjustment for credit quality.

ADVANTAGES

A market neutral strategy based on mortgage-backed securities involves two steps. First, one must select individual securities and analyze how these securities complement each other in a portfolio context. Second, one must immunize the portfolio from expected and actual interest rate movements. This hedging can be accomplished by using a variety of financial instruments.

Ideally, a market neutral portfolio of CMOs and their hedges will experience no gains or losses resulting from interest rate movements. The ultimate objective is to maintain a constant net asset value (NAV)—assets less liabilities—irrespective of rate movements. To use a security analogy, the portfolio should behave like an uncapped floating-rate security, which theoretically should not have any price movement. (Of course, floaters do exhibit price action, but changes in their value are generally the result of credit quality changes, supply and demand, spread widening, or other reasons unrelated to underlying interest rates.)

One might ask, why not simply invest in floating or adjustable securities or in very short-maturity fixed-rate CMOs? The answer is, these instruments often do not provide adequate returns. Market neutral investing allows the manager to take advantage of higher yielding (although riskier) securities, while eliminating, or at least minimizing, exposure to underlying rate movements.

A market neutral approach allows managers of floating-rate funds to enhance returns by investing in other market sectors and exploiting alternative opportunities while maintaining targeted floating-rate return characteristics. Financial entities such as banks with floating-rate liabilities, or leveraged funds that borrow at short-term rates, may also find the approach useful.

Furthermore, market neutral strategies can be designed relative to a variety of underlying payoff patterns. Thus a portfolio designed to have no interest rate exposure is market neutral only if its NAV does not vary with interest rates. However, a portfolio designed to defease a 10-year fixed-rate liability (which would move as a function of the 10-year Treasury note) is market neutral if its NAV varies in line with the 10-year Treasury note. That is, a portfolio can be considered market neutral even if its NAV changes. What is important is that the portfolio's NAV relative to some underlying benchmark or liability does not change as a result of interest rate movements. Market neutral strategies are thus valuable, not only for floating-rate portfolio managers, but also for those with long-term, fixed-rate portfolios, including insurance companies, pension funds, and mutual funds targeting a long-term bond index.

SECURITY SELECTION

Higher expected returns can be achieved by investing in securities that are judged to be fundamentally underpriced relative to alternative investments of comparable credit quality. Cheapness in and of itself does not, however, guarantee high returns in all interest rate environments; it merely suggests that the weighted average return over all rate scenarios will be high. With market neutral investing, purchased securities are hedged to immunize them against interest rate changes. The securities and hedges thus provide the same (expectedly high) return over all interest rate scenarios.

Construction of a market neutral portfolio is accomplished security by security. Some CMOs perform well when rates fall, while others perform well when rates rise. Put simply, if the positive performance of a bullish security in a falling rate environment outweighs its negative performance in a rising rate environment, or if the positive performance of a bearish security in a rising rate environment outweighs its negative performance in a falling rate environment (while each security maintains positive performance in an unchanging rate environment), then each security is fundamentally cheap and will have a high expected return. Also, if the positive performance of a security in a volatile interest rate environment outweighs its negative performance in an unchanging or stable environment, or vice versa, then that security, too, is undervalued.

Cheapness in the mortgage market is usually the result of inefficiencies that arise as a result of the prepayment option embedded in mortgage securities. Virtually every mortgagee has the ability, or option, to prepay his or her mortgage at any time. The primary noneconomic reason for prepaying a mortgage is the sale of a property. The primary economic reason for prepayments is the ability to replace a current mortgage with a new, cheaper one (i.e., to refinance).

If all mortgagees acted in a predictable manner, the mortgage market would trade like the corporate bond market and, without the credit component, there would be relatively few inefficiencies to exploit. However, prepayment activity is often unpredictable, and inefficiencies arise as dealers and investors apply a variety of prepayment and interest rate models to value these securities Investors with better models, better research into models, and a better understanding of their models, may thus be able to exploit these inefficiencies.

Option-Adjusted Spreads

One theoretical measure of the value of a security is its option-adjusted spread (OAS). OAS analysis provides a uniform, rational approach to valuing a security net of embedded options. This in turn allows direct comparison to other instruments.

OAS analysis uses information from the Treasury or swap yield curve to derive statistically an interest rate process that can be used to value CMOs. This process observes no-arbitrage conditions across the yield curve, and accurately prices other fixed-income instruments, such as corporate bonds, swaps, and options. For mortgage-backed securities, however, OAS analysis also involves application of a prepayment model that attempts to capture the effects of interest rates on the mortgagee's option to prepay. The end result is the security's expected return, stated in terms of its return spread over the forward yield curve, adjusted for the prepayment option and any other embedded options (e.g., caps and floors).

OAS analysis allows a portfolio manager to screen a large number of securities quickly. The size and diversity of the CMO market makes speed and efficiency of analysis critical. Purchase decisions require some judgment and subjective analysis, which are time-consuming; OAS analysis can be used to screen out securities that are clearly overpriced, thus allowing the manager to focus on bonds that meet predetermined return criteria. OAS analysis can also provide effective duration and convexity measures, useful in hedging, and can pick up hidden risks (such as whipsaw risk), which traditional static analysis does not capture.

However, OAS analysis has certain shortcomings. The greatest source of error is the potential inaccuracy of the prepayment model. A prepayment model can fit historical data very well, yet might not be a good predictor of future prepayment rates. Changes in demographics, in the economy, the mortgage industry, technology, and the yield curve may cause future prepayment patterns to differ from past ones. Furthermore, historical prepayment data are available over a relatively short time period, so their reliability is limited. Consequently, even the most robust prepayment model cannot be relied upon with great comfort.

Models must also be updated continually to take into consideration all new information. Using older models can be very disastrous, indeed. For example, over the last decade, with the increase in household debt levels as well as the boom in home prices, an interesting phenomenon occurred: even when mortgage rates were not particularly low, homeowners were refinancing in larger numbers than most models predicted. Those models failed to appreciate that homeowners paying much higher interest rates on large credit balances were able to take advantage of the increase in equity in their homes by doing a “cash-out refinance,” consolidating their debts at a lower average rate.

OAS analysis also makes assumptions about the future volatility of interest rates. Of course, we do not know what the volatility for rates will be; we can only make a best guess, given the realm of possible paths and the probability of each. However, even though model volatility can differ significantly from actual volatility, volatility misestimation is less of a problem than prepayment error. Because managers can use other instruments, such as swaptions and caps and floors, to offset some of the risk of mortgage volatility, they have a better handle on volatility than on prepayments.

Finally, the interest rate diffusion process implicit in an OAS model may not be an accurate gauge of future interest rate paths. The interest rate process generates statistically reasonable estimates of the shape of the yield curve and future volatility, but it cannot generate all possible paths and may not assign accurate probabilities to various paths. A discussion of interest rate processes, of which there are many, is beyond the scope of this chapter.

The results of OAS analysis can thus provide a guide, but not a mile-by-mile road map, to selecting CMOs. Human judgment must be exercised in interpreting the results. For example, a security may have a high OAS that exhibits intense sensitivity to small changes in prepayment assumptions. A security with a lower OAS may be preferable if it presents a more stable profile. The more stable the OAS, the less the prepayment risk.

Portfolio managers must examine the quality of OAS numbers, because accuracy of the underlying assumptions and forecasts will not be known until it’s too late. For example, the manager may purchase an

EXHIBIT 6.1 Prepayment Risk

	FHR 1971 S	FHR 1688 SA
Purchase Price (July 1997)	4.6875	8.4843
Base Case OAS	1113	333
Fast OAS (1.5 times base case prepayments)	–874	–360
Slow OAS (0.75 times base case prepayments)	1989	601
Actual Annualized Return	–29.84%	12.88%

interest-only (IO) security because it has a high OAS. If it turns out that the prepayment model underlying the analysis was inherently slow, however, the results could be devastating, as many portfolio managers have found out. Similarly poor results can ensue when a manager purchases a support bond with a high OAS and the volatility assumed in the analysis turns out to be lower than the actual volatility.

It is thus important to gauge the magnitude of the error inherent in the OAS analysis to see whether the expected return justifies the risk of this error. This can be done by testing the results using different assumptions. As an example, Exhibit 6.1 compares two inverse IO securities—the FHR 1971 S and the FHR 1688 SA.

In July 1997, the FHR 1971 S had a much higher OAS (1113) than the FHR 1688 SA (OAS of 333). However, the higher OAS had a much more volatile profile and indeed ended up being a much poorer investment than the FHR 1688 SA. Subsequent to the purchase date, market volatility increased and prepayment rates rose substantially relative to the assumption of the initial OAS, causing tremendous divergence in the performances of the two securities. Varying the speed of the prepayment model would have revealed the potential volatility of the FHR 1971 S.

Prepayment Testing

Prepayment behavior is tremendously dynamic. This dynamism reflects, foremost, the changing technology of mortgage financing. Refinancing a mortgage has become much less expensive and time-consuming. With Internet refinancing just a click away and the introduction of newer mortgage products such as hybrid ARMS and interest-only mortgages, prepayments can be expected to become even more responsive to interest rates in the future.

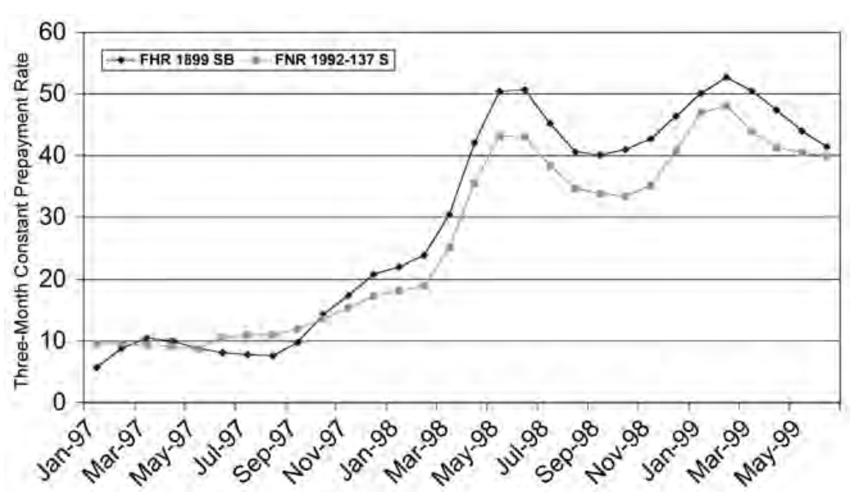
Other assumptions underlying prepayment estimates are also subject to change. For example, prepayment rates generally differ with the maturity, or "seasoning," of the mortgages in a given pool, as well as with the pool's "burnout" rate—the extent to which the pool has already been subject to prepayment. Typically, newer mortgages prepay at a slower rate than more seasoned ones, and prepayment rates are expected to slow for pools that have already incurred heavy prepayments. These relationships can and do change over time, however.

Exhibit 6.2 illustrates the effect of burnout, using two securities. The FHR 1899 SB is a security derived from an 8% pass-through with a weighted average coupon of 8.504% and a weighted average maturity (as of June 1999) of 317 months. The FNR 1992-137 S is a security derived from an 8% pass-through with a weighted average coupon of 8.579% and a weighted average maturity of 262 months.

Without taking burnout into account, one would expect the FNR 1992-137 S to prepay faster, because the average coupon is 7.5 basis points higher, meaning that the mortgagees in the FNR 1992-137 S pool will have a greater incentive to refinance. However, the FNR 1992-137 S is more than five years older than the FHR 1899 SB; it has already gone through one interest rate cycle and the remaining borrowers are somewhat less likely to refinance. As a result, the FNR 1992-137 S is somewhat burned out, and should show a consistently lower prepayment rate than the non-burned out FHR 1899 SB. However, this relationship may change over time and may even reverse itself, as burnout is a dynamic phenomenon.

Burnout can have a significant effect on the value of a security. It represents another opportunity to exploit market inefficiency. If different market participants have different burnout rates factored into their models, their valuations could exhibit substantial differences.

EXHIBIT 6.2 **Effect of Burnout on Mortgage Securities**



To test a security's sensitivity to prepayments, a portfolio manager can calculate the prepayment derivative—the change in value of OAS for a given change in the prepayment model. The change in the prepayment model is usually expressed as a percentage of the base model. In other words, 125% represents a prepayment speed 1.25 times the model's initial forecast for a given interest rate. Given a choice between two securities with roughly the same OAS, the portfolio manager should select the one with the lower prepayment derivative, because this security's OAS is less dependent on the accuracy of the model.

In addition to calculating the prepayment derivative, which is a uniform increase or decrease in the prepayment function, the portfolio manager should also check the security's sensitivity to adjustments in housing turnover, seasoning, burnout, and refinancing incentives that occur at different times over the life of a mortgage. For example, because no one fully understands the effect of burnout, the model should be modified to increase or decrease the burnout effect. Again, given a choice between two securities with the same OAS, the one with less sensitivity to perturbations in specific model parameters is usually preferable.

Throughout 1992 and 1993, many investors were hurt by buying interest-only strips and similar derivatives. Virtually every prepayment model identified these securities as being cheap and having a high OAS. Yet, even when investors hedged these securities, they still experienced losses. The reason was that prepayment models at the time did not accurately predict how quickly prepayment rates would rise in response to falling interest rates. Conversely, some investors were further hurt in 1994, when prepayment rates slowed dramatically. By this time, many investors had become accustomed to the high prepayment environment and tended to neglect how significant extension risk could be when interest rates rose. Testing prepayment sensitivity (using artificially fast or slow prepayment assumptions) would have identified these risks before they caused losses.

Early in 1998, buying in U.S. Treasuries and mortgage securities caused mortgage rates to fall. Many investors expected prepayments to increase, but few accurately gauged the magnitude of the increase. Because rates had briefly reached the same levels in early 1996, without occasioning a large spike in prepayments, most felt that higher-coupon mortgages had already burned out, and that prepayments would remain relatively benign. However, given the strength in the housing market and the economy in general, and the length of time that mortgage rates were at historical lows, the potential refinancings of 1996 became the actual refinancings of 1998. Investors in IOs, who had been pleasantly rewarded in the previous few years, were suddenly faced with large losses. Had prepayment assumptions been tested—specifically, had prepayment *components* been individually tested—investors might have been able to avoid those securities that exhibited the greatest sensitivity to prepayment rates (or to find principal-only (PO) securities that would have provided an adequate hedge).

Duration and Convexity

A bond's duration provides a gauge of the sensitivity of its price to changes in interest rates. Normally duration can be calculated by discounting the weighted average life of the cash flows (coupon or principal received at each payment date) by the bond's rate of interest. The percentage change in a bond's price, given a small parallel shift in the yield curve, can be estimated by multiplying the bond's duration by the size of the shift.

However, Macaulay duration, or modified duration, cannot capture the embedded option feature of a mortgage security. In order to capture the effect of a change in the discount rate on prepayment rates, it is necessary to calculate effective, or option-adjusted, duration. This is done by calculating the change in price necessary to achieve the same OAS, given a change in interest rates. Option-adjusted duration (OAD) suffers from the potential weaknesses of OAS analysis, but it is far more indicative of the theoretical price movements of a CMO than the more common measures of duration used for Treasuries or noncallable corporate bonds.

Convexity is a measure of the change in duration due to changes in interest rates. Most of the time, most mortgage-backed securities experience negative convexity. That is, their durations will contract in a falling rate environment, reflecting an increase in prepayments, and extend with rising rates, as prepayments slow.

Volatility Testing

Because of their embedded options, mortgage securities are also susceptible to changes in the volatility of underlying rates. Volatility is defined as the standard deviation of interest rates and is usually expressed as an annual percentage. The volatility derivative, referred to as "vega" in traditional option pricing, can be defined as the change in the price of a security given an OAS for a change in volatility. In general, volatility affects only the option components of mortgage-backed securities (although there are exceptions).

An increase in interest rate volatility increases the value of the option to prepay. That is, for mortgagees, increasing volatility means a greater likelihood of the option's being exercised to take advantage of lower rates. As holders of the CMO are normally short this option, the opposite holds true for them: increasing volatility reduces the value of their position, because the increased likelihood of prepayment reduces the security's OAS.

In terms of the security's convexity, an increase in the volatility assumption increases the security's (negative) convexity, and lowers its OAS. This is because the OAS combines the bond's unadjusted spread over the forward curve with an adjustment that accounts for the convexity introduced by the prepayment option. An increase in volatility will increase the absolute value of the bond's convexity while leaving the unadjusted spread unchanged; the increase in convexity, assuming it has a negative sign, will reduce the security's OAS. (Of course, the reverse is true for securities with positive convexity.)

In addition to testing the prepayment rate, portfolio managers should test the volatility assumptions underlying their prepayment models. Testing the effects of higher volatility assumptions can highlight potential risks. Given a choice between two securities with the same OAS and the same response to changes in the prepayment rate (prepayment derivative), the one with the lower volatility derivative would generally be preferable.

In a portfolio context, of course, it may be possible to hedge this volatility risk. For example, when a mortgage-backed security with a lot of negative convexity is hedged with a long option position with positive convexity, an unexpected increase in volatility will likely result in underperformance of the mortgage-backed security but outperformance of the option. The combined position can thus be market neutral.

Other Considerations

OAS analysis and testing do not address other issues that may affect the security selection decision. For example, mortgage-backed securities are unique in that the dollar price of the security can dictate its prepayment and convexity exposures. A deeply discounted security may have positive exposure to an increase in prepayment rates. As rates fall, and the security's price increases above par, however, its exposure to an increase in prepayments may turn negative. Many mortgage managers have suffered significant losses because they failed to take the dollar price of the security into account.

Market considerations may also be an issue. Given a choice between two securities with comparable OASes but different average lives, for example, conventional wisdom holds that the security with the shorter average life may be preferable. This is because inaccuracies in the assumptions, particularly in the prepayment model, are likely to be less (or have less effect) in the near term than the longer term. As the shorter bond matures, however, money will have to be reinvested; if the OAS is extraordinarily high, there is the risk that cash flows cannot be reinvested at a comparable level. It may thus be preferable to buy the longer security and lock in the high OAS for a longer period of time.

Similarly, a bond that is perceived as more liquid, or one that may have a greater chance for capital appreciation because of market inefficiencies or overall mortgage market spreads, might be preferable to a bond that is illiquid and difficult to trade, even if the latter has a higher OAS. The judgment of the manager is critical. Proper evaluation of securities requires scientific methods, but it involves a certain amount of intuition besides. There are always tradeoffs that cannot be captured by computer or model.

It is also important to look ahead, when selecting securities, to the entire portfolio context. Individual securities that do not meet certain OAS-based requirements may be able to be combined with other securities having offsetting risks to form an acceptable blended synthetic. For example, an IO may have too great a prepayment derivative by itself, while a PO with similar collateral may have an almost equal, but opposite, prepayment derivative. If the OAS of the combination is high and the total prepayment derivative is low, the combination may be suitable.

Consideration should also be given to the problem of hedging the portfolio. Some bonds may have high OASes and even low risks in terms of their sensitivities to various model assumptions, yet still be unsuitable candidates because of the difficulty or cost the manager would incur in hedging them.

PORTFOLIO CONSTRUCTION

Option-adjusted spread analysis of more than one security at a time is an extremely powerful tool. It allows for security selection that can take advantage of the natural hedging relationships among securities and for the evaluation of the portfolio as an entity.

For example, the portfolio manager might reject a given IO and a given PO as individual securities, because of high prepayment exposure or other risks. OAS analysis may show that the two securities in combination are very suitable candidates. Or it might reveal that the two securities do not complement each other over all possible interest rate paths. Such relationships are difficult to determine without OAS analysis. For example, investors are at an extreme disadvantage buying IOs or POs based upon simple, static yield tables, which typically do not account for any shifts in prepayment rates or changes in forward rates.

OAS can also be used for overall portfolio analysis. Merging the cash flows of an entire portfolio and running an OAS analysis can allow the manager to see how the risks inherent in some securities are offset by certain features of other securities. Virtually all mortgage securities have some positive and some negative characteristics. Combining securities with different flaws and different strengths in the same portfolio can allow the manager to minimize the hedging (and associated costs) required to create a market neutral portfolio.

This is where analysis of interest rate paths is important. We have noted that the discounted cash flows of a floater will give the same price for each interest rate path; the price of a nonfloater will vary over different paths. Although OAS analysis provides a weighted average price, some interest rate paths generate prices that are higher than the average, while others generate lower prices. Path analysis can be used to determine which interest rate scenarios are detrimental to a portfolio, and how they can best be hedged in order to achieve a market neutral portfolio that will replicate a floater and have the same price over all scenarios.

As with OAS analysis of individual securities, OAS portfolio analyses should include estimation of prepayment and volatility derivatives. Additionally, at the portfolio level, the manager should perform OAS analyses across collateral, testing the sensitivity of the portfolio to relative errors in the prepayment model for each collateral type, coupon, and loan age. A portfolio might exhibit a very low prepayment derivative overall, but if the prepayment model is slow for one type of collateral and fast for another, actual results could differ dramatically from expected results. A prepayment derivative should thus be calculated for each different type of collateral to see if the risk is within reason, and whether it requires additional hedging.

HEDGING

The hedging function can be viewed as a means to convert the cheap security, which has a high weighted average return with a potentially large deviation over different interest rate paths, into a synthetic combination that has the same return, or spread, with very little deviation over all scenarios. Accomplishing this means eliminating the price risk, or the duration and convexity, of the portfolio.

Hedging is a full-time job. As interest rates and prepayments vary, it is necessary to evaluate constantly the efficiency and effectiveness of a hedge and to make adjustments as needed. A manager cannot sit back and observe. Hedging is an active process, as theory does not always apply in practice.

A portfolio's duration, like a bond's duration, can be viewed as a measure of its price risk. A duration neutral portfolio can be thought of as exhibiting zero deviation in price over all interest rate paths. Unfortunately, duration alone does not accurately reflect a portfolio's sensitivity to large moves in interest rates.

To be truly market neutral, a portfolio must be not only duration neutral, but also convexity neutral. A convexity neutral portfolio can be thought of as providing zero deviation in duration over all interest rate paths. Understanding duration and convexity and identifying the most efficient hedges for achieving duration and convexity neutral portfolios represent the biggest challenges in managing market neutral CMO portfolios. The complexities of hedging are just as great as those involved in analyzing the securities themselves.

Key Rate Durations

Recent innovations in technology have allowed portfolio managers to determine not only the duration of a security, but also the key points for addressing duration. The importance of this becomes abundantly clear if one considers the problem of hedging planned amortization class (PAC) bonds against yield curve twists (i.e., steepenings, flattenings, and humps in the yield curve). For example, one would not want to hedge the interest rate risk of a five-year, tight-window PAC with a two-year swap, Treasury or futures contract. Nor would one propose to use long bonds or long bond futures.

This conclusion seems obvious in the case of securities with bullet-like amortizations. It is less clear when hedging wide-windowed securities, support bonds, or inverse floaters with constant-maturity Treasury (CMT) indexes. The problem here is determining the appropriate duration to hedge.

In most OAS analyses for mortgages, there are 360 (30 years times 12 months) time steps. Theoretically, the manager could short Treasuries or construct swap contracts to hedge almost all 360 time points, but it would be very expensive and time-consuming to do so. In practice, the manager has to choose what points on the yield curve he or she considers the *key* rates, or benchmark points, to hedge. Often the manager chooses the maturities of the liquid, on-the-run Treasuries.

OAS analysis can then be used to calculate the price change relative to each key rate, in much the same way the effective duration is calculated for the whole yield curve. The portfolio manager can then determine the most appropriate hedges. A single security may have positive duration with respect to one point on the yield curve, while having negative duration with respect to another.

For example, a two-year PAC inverse IO has a duration similar to that of a two-year Treasury. However, if long rates fall, and mortgage rates follow, the security's value will fall as the bond shortens as a result of the expected increase in prepayments. The security thus has negative duration with respect to the long end of the yield curve, but positive duration to the front end of the yield curve. These different exposures should be hedged.

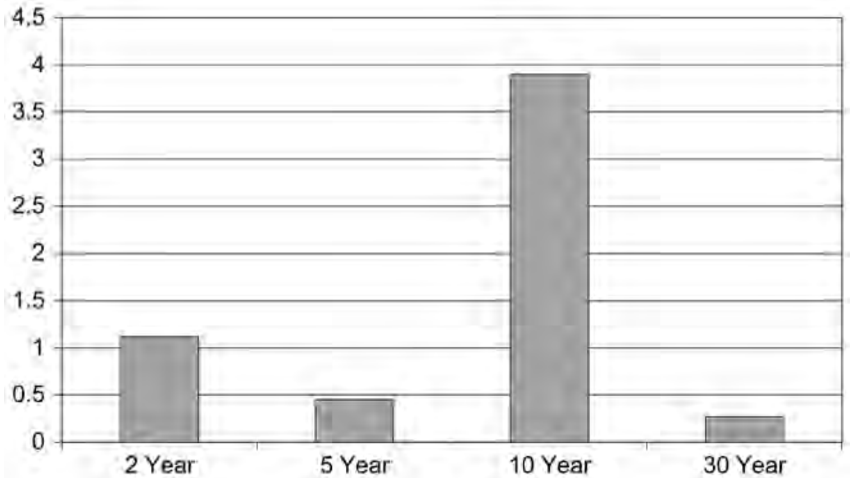
Exhibit 6.3 illustrates, as an example, the FNR 1993-178 SD. This security is a short (approximately two-year) average life PAC inverse floater. However, because its coupon formula is based on the 10-year constant-maturity Treasury, its key rate duration shows a different exposure profile. The biggest exposure of this security is to the 10-year Treasury note.

Prepayment Hedging

Maintaining a market neutral portfolio means attempting to eliminate prepayment risk. Success in this endeavor depends upon the accuracy of the prepayment model used to determine the level of prepayment risk and on the ability of the hedging instruments to immunize against this risk. Prepayment risk can only be truly hedged with other mortgages or CMOs or with options on mortgages, as these are the only instruments that have prepayment risk.

Prepayment models assume slower prepayments in a rising interest rate environment and faster prepayments in a falling rate environment.

EXHIBIT 6.3 **FNR 1993-178 SD Key Rate Duration**



However, actual prepayments might not mimic model forecasts. Changes in the mortgage market, economic activity, and/or demographics could render some models less useful. We noted earlier that model error should be less important for securities that have low prepayment derivatives. However, this result may not hold if markets move.

Consider, for example, a security priced at par. This security has little prepayment risk, which may be adequately hedged with Treasuries or swaps. Given a large market movement, however, this security could become an $80 security with a large positive prepayment exposure that a Treasury or swap hedge will not cover. The portfolio manager can, however, purchase an IO product (with similar collateral, if not another tranche off the same CMO structure) that will serve to increase the overall portfolio's yield and reduce the newly emerged prepayment risk.

Of course, in hedging a portfolio of mortgage securities in order to achieve market neutrality, the manager will have to take into account not only the portfolio's prepayment risk, but also factors such as its overall sensitivity to underlying rate changes. The manager is likely to take advantage of a variety of instruments. These instruments, and their benefits and limitations, are discussed below.

Interest Rate Swaps

An interest rate swap, in its simplest form, is an agreement between two parties where one party pays a fixed rate of interest while receiving a floating rate of interest, usually LIBOR, and the other party takes the opposite position. Because most CMOs have fixed-rate coupons, interest rate swaps can be a valuable hedging mechanism.

Consider, for example, a portfolio that is benchmarked to LIBOR. The portfolio manager finds a fixed-rate security that appears to be cheap. The manager can buy the security and enter into a swap to pay fixed and receive floating. The portfolio will earn LIBOR plus any difference between the yield on the security and the fixed rate paid in the swap (adjusting for such factors as day count). To the extent that the security does turn out to have been purchased cheaply, this difference will be positive and the portfolio will earn a positive spread over LIBOR.

Swaps are over-the-counter agreements that can be tailored to the specific needs of the portfolio manager. They can thus provide very accurate hedges. Unfortunately, the more complicated or unique the swap, the more expensive it tends to be.

Interest rate swaps also suffer from two fundamental problems: they are somewhat illiquid, and they have counterparty credit risk. Illiquidity should not be a critical problem for a buy-and-hold portfolio manager. It can be more of a problem for an actively traded account, as it is likely to result in a wider bid-ask spread that can increase the portfolio's transaction costs. Even here, however, the profit expected from the mortgage investment may exceed the bid-ask spread on the swap, making the mortgage-plus-swap combination attractive.

Furthermore, an active trading account does not generally sell off securities for purposes of liquidating the account, but in order to replace one asset with another, cheaper asset. The portfolio manager can thus maintain a core group of swaps while substituting assets opportunistically. If the manager does choose to sell off securities and maintain a large position in cash, a long position in Treasuries can be used to maintain the desired duration without liquidating the swaps. The illiquidity of swaps is thus not critical.

This leaves the problem of counterparty credit risk. A swap leaves each party exposed to the credit quality of the other. This is why banks with high credit quality have historically been the best candidates for swap transactions. More recently, the need for high credit quality counterparties has led to the creation of several AAA swap dealers, some of which are special purpose subsidiaries of broker-dealers, set up strictly for such transactions.

Fortunately, the swap market is efficient and competitive enough that, even with a limited number of high-quality swap counterparties, it is possible to obtain reasonable rates without sacrificing credit quality. Furthermore, portfolio managers and dealers now have daily marks to market and bilateral collateral arrangements that require counterparties to post margin to each other to cover the net present value of the swap. Such arrangements allow the manager to engage in swaps with lower-quality counterparties without incurring substantial credit risk.

The specific problem of swaps with regard to CMO hedging is that they generally have fixed maturities or deterministic amortization schedules, while mortgages are exposed to unpredictable prepayment risk. In order to hedge this risk, the portfolio manager will have to use options, either on the swap or on similar fixed-income instruments such as Treasuries or mortgages.

Theoretically, then, interest rate swaps can provide an important hedging instrument for CMO portfolios. However, practical considerations, including regulatory and balance sheet issues, must be explored to see if the cost of such a trade is compensated for by the yield pickup from the trade.

Financial Futures

Several futures contracts can provide an alternative to swaps as hedging vehicles. Futures offer liquidity, price transparency, and the high credit quality of the exchange clearinghouse. Eurodollar futures provide a very good proxy for short-term swaps and are particularly useful for LIBOR-based funds. Eurodollar futures have maturities up to 10 years, although liquidity is relatively low for back contracts. As they are cash settled, there are no technical factors related to supply and demand, and no delivery options.

For longer-term securities, Treasury bond and note futures can be valuable hedging instruments. Contracts exist for the 2-, 5-, 10- and 20-year Treasury securities. Treasury bond futures do not capture swap spreads, which can be a risk for LIBOR-based funds, but their liquidity and high credit quality may compensate for this, at least in the short term. Furthermore, swap spread risk can be hedged independently, without actually entering into swaps.

Nevertheless, hedgers using futures should be aware of some problems and complexities. First, technical situations with deliverable bonds can reduce the implied financing (repo) rate, causing negative carry for the short position in the contract and potentially wiping out the return of the asset.

Second, the short position in the contract has certain delivery options that are priced into the contract. These options can be classified as either timing or quality options. There is a great deal of academic research dealing with these options, and although their values are disputed, it is generally agreed that they have significant value and that the seller of a futures contract is selling at a price lower than the cash-and-carry price because of these options.

Finally, futures contracts are marked to market daily, and margin must be posted to either the buyer's or the seller's account if the contract price changes. This is an additional complication that the manager using futures to hedge must consider.

Treasuries

Hedging can be accomplished by shorting appropriate Treasury securities. Treasuries have great liquidity, which makes it almost cost-free to unwind a trade. Furthermore, Treasuries can be sold along the entire yield curve, unlike futures contracts, which have only a limited number of maturities. Treasuries can allow more accurate hedging than futures and more efficient hedging, with less credit risk, than swaps.

In certain situations, however, the repo rate may be significantly lower than the short-term rate. Treasuries may thus be very expensive to borrow. The cost can reduce or even wipe out the spread of the CMO over time. A portfolio manager choosing to hedge by shorting Treasury bonds must have a thorough understanding of the Treasury and repurchase markets.

Options

Options are an important aspect of CMO portfolio management, as the underlying assets virtually always have embedded options. Only options or instruments with option-like characteristics can truly hedge the convexity element of mortgage portfolios.

If a portfolio of mortgage securities has negative convexity, the manager can purchase options; long option positions have positive convexity. The option purchases increase the cost of the hedged portfolio, hence reducing the yield relative to the unhedged portfolio; but they also offset the negative convexity. If the options are priced fairly, the OAS should remain the same, but the performance of the hedged portfolio should remain more stable over various rate paths, which is the goal for a market neutral portfolio.

Of course, a portfolio may have positive convexity. Positive convexity can result from positive response to changes in prepayments, as when a rise in prepayments increases the price of POs, or from embedded options such as a cap on an inverse floater. In this case, the manager can sell options; short option positions have negative convexity. The premium received from option sales will reduce the cost of the overall portfolio and increase its yield. (Of course, in selling options, the manager gives up any potential windfalls from the options going in the money.)

It is important to understand that it is not necessary to buy or sell actual options in order to offset the options embedded in a CMO portfolio. Rather, the portfolio manager can dynamically hedge the effective duration of the portfolio, using interest rate futures. In effect, dynamic hedging replicates the option position that would offset the portfolio's embedded options. Dynamic, or delta, hedging, however, is very sensitive to underlying assumptions. If volatility turns out to be materially different from the volatility assumed, for example, a dynamic hedge can turn out to be significantly more expensive than expected. Furthermore, conditions such as gaps in the price of the underlying assets can cause the hedge to fail to replicate the desired option.

Options can be bought or sold on Treasuries, on any of the futures contracts mentioned, on a specific interest rate or index, or on swaps themselves. Portfolio managers using options must use pricing models to compare option prices across different markets in order to ensure that only the fairly priced options are purchased. Paying too much for options diminishes the returns of a CMO portfolio. A thorough understanding of option instruments and option pricing is required for successful CMO portfolio management.

HISTORICAL EXAMPLES

In the 1990s, there were two instances of intense stress in the mortgage market. From the end of 1993 to late 1994, interest rates rose dramatically and prepayments slowed dramatically. From the first quarter of 1998 to the end of 1998, interest rates fell dramatically and prepayments increased significantly. These periods best demonstrate the value of the analysis discussed above and the validity of the market neutral trading strategy.

Hedging Duration

The FHLMC 1468 SC is an inverse floating-rate security that is a planned amortization class (PAC). In January 1993, the effective duration of the security was approximately 22, indicating that a 100-basis-point move in interest rates would induce a 22-point move in the security's price. Because this is a PAC bond, there is not much convexity due to prepayments. In other words, its duration would remain relatively constant over large rate changes.

So, where do profit opportunities come from? If the bond is purchased at a cheap level, there is a good chance it will tighten (on an OAS basis) and a profit can be realized without any change in interest rates. Furthermore, profits can be made from market moves and the changing characteristics of the security.

Exhibit 6.4 shows the bond's price as well as the 10-year Treasury yield at various dates in 1993 and 1994, the time of the trade. It also shows the price at which the bond would be owned—that is, its price net of the gain or loss on a duration-equivalent hedge—and the profit or loss on the position (without taking the positive carry on the portfolio into consideration).

It can be seen that there were significant profit opportunities as the market moved. In 1993, the bond traded at 99.53 in January and at 116 in August. Had it been duration-hedged, the price of the bond net of the hedge would have been 111.32. Had the bond been purchased in January, hedged, and sold in August, there would have been a 4.68-point profit.

EXHIBIT 6.4 **Duration-Hedged FHLMC 1468 SC**

Date	Transaction Price	10-Year Yield	Price Owned	Profit/ (Loss)
January 23, 1993	99.53	6.38%	99.53	
August 4, 1993	116.00	5.85%	111.32	4.68
November 14, 1994	69.00	7.94%	65.34	3.66

This profit reflects in part the fundamental cheapness of the security at purchase. However, it also reflects the fact that prepayments accelerated in a low-rate, steep yield curve environment.

Had the bond been purchased in January 1993 and held until November 1994, the price net of the hedge would have been 65.34, whereas the bond actually traded at 69 on this date. Had the bond been purchased in January 1993, hedged, and traded in November 1994, there would have been a 3.66-point profit. This profit reflects the fact that, as rates rose and the inverse floater approached its cap, it tended to exhibit substantial positive convexity, and therefore its price decline was mitigated relative to fixed-coupon securities (i.e., Treasuries). In this scenario, the PAC protection prevented extension, thus keeping the duration of the bond within the duration of the hedge. This trade is one of many examples that demonstrate the liquidity of the market in 1994 was not as bad as many thought.

This portfolio of a PAC bond and its hedge would have been profitable regardless of the move in interest rates. PAC bonds were cheap in 1993 because, lacking the yield of a support bond, they were disregarded by most investors. This may seem obvious now, but at the time investors were sacrificing protection for higher yield.

Hedging Convexity

Using the example of the FHR 1983 S, a support bond that exhibited great variability of average life, Exhibit 6.5 illustrates problems that arise in attempting to hedge mortgage security convexity. When issued, in July 1997, the security had an attractive and stable OAS. The anticipated average life of the security was approximately four years, with an effective duration of approximately 14.

Hedging this security would have been quite complicated, as it was purchased at a price close to par. If interest rates declined, and prepayments increased, owning the bond at too high a dollar price could have resulted in a substantial loss. In fact, from July 1997 to January 1999, the 10-year Treasury yield decreased 157 basis points. If managers had hedged the bond's effective duration with a short 10-year Treasury position, they would have seen their cost basis on the security increase to approximately 125—to catastrophic effect.

EXHIBIT 6.5 Convexity Hedging, FHR 1983 S

	OAS	Convexity	Duration
Base Case	119	–349	14.59
Fast Model	265	–283	11.39
Slow Model	62	–319	17.57

This security clearly needed to be hedged with options. An option-based hedge would have provided interest rate protection while controlling for changes in the dollar price of the security. Additionally, even the model that assumed a fast prepayment rate underestimated the actual negative convexity of the security. An option hedge would have been the only type of effective hedge, as any losses on the security due to an unexpected increase in volatility would have been offset by a profit on the option hedge. As the security paid off in January 1999, this hedging strategy was the only effective one.

CONCLUSION

The CMO market encompasses hundreds of security types as well as different collateral types and, for floating-rate securities, different interest rate indices in the coupon formula. A thorough understanding of the market requires quantitative analysis and adequate systems and models. In general, however, portfolio managers use more rudimentary pricing methods, even though these methods are not accurate. As a consequence, the market is relatively inefficient, and the astute manager may be able to identify relatively cheap securities that will yield positive excess returns.

Identifying fundamentally cheap mortgage securities requires comprehensive quantitative analysis and an understanding of the practical aspects of the market. If it is done correctly, the rewards can be substantial. If it is done incorrectly, or in an incomplete manner, the risks can be substantial. It is important to remember that mortgage securities can be synthetically created in more liquid, more straightforward markets that are less susceptible to the vagaries of underlying rate movements. Therefore, unless the manager can identify relatively cheap securities with some accuracy, mortgage securities should probably not be purchased.

Option-adjusted spread analysis can provide the portfolio manager with an invaluable tool for evaluating individual mortgage securities and portfolios as a whole. OAS analysis can be used, for example, to identify cheap securities with high expected returns. It can also be used to evaluate combinations of securities, in order to arrive at a portfolio that maximizes the return contribution of each security while using the offsetting characteristics of different securities to minimize overall portfolio risk.

OAS analysis provides a single number that is a weighted average of a comprehensive set of possible interest rate paths. Some of these paths may be good for portfolio returns and some may be bad. A market neutral portfolio, by contrast, exhibits the same return regardless of the interest rate path. This can be achieved to a large extent by hedging.

Hedging in essence converts the portfolio of cheap mortgage-backed securities, which has a high expected return but potentially large return deviations, into a hedged portfolio that provides the same high expected return but displays little deviation. For sophisticated managers, hedging opens the door to a wide range of assets that might not be considered eligible investments in the absence of hedging. Thus a floating-rate mortgage fund does not have to confine itself to floating or adjustable-rate securities, but can pursue higher returns in mortgage securities, while using hedging to reduce their risk to acceptable levels.

CHAPTER 7

Merger Arbitrage

Daniel S. Och
Senior Managing Member
Och-Ziff Capital Management Group

Todd C. Pulvino, Ph.D.
Associate Professor of Finance
Kellogg School of Management, Northwestern University
and
Principal
CNH Partners

Merger arbitrageurs make money by writing insurance against failed merger attempts. When a merger is announced, the target's stock price typically appreciates by 20% or more. Yet even with the substantial price increase, the target's stock usually trades at a 1% to 3% discount to the price offered by the acquiring company. The reason for the discount is that there is a nonnegligible probability that the announced merger will fail to be consummated.

There are many reasons why a merger might be called off. Government regulators charged with preventing monopolies might determine that the merger would adversely affect competition, and they might file a lawsuit to block the merger. Industry conditions might change, altering the economics of the business combination and causing the target or acquirer to cancel the deal. Shareholders, concerned that the merger is not in their best interest, might vote against the merger.

Whatever the reason for aborting the deal, the effect on the target's stock price is usually the same—a significant decrease, usually on the order of 25%. Shareholders of target companies that are the subject of a takeover thus face a choice. They can continue to hold the target's stock, in the expectation of obtaining the full consideration offered by the acquirer, but bearing the risk that the announced merger will not occur. Or they can insure against the risk of the merger being cancelled prior to consummation by selling the stock and locking in the current price. Those who decide to sell and avoid the "deal risk" sell to merger arbitrageurs.

Merger arbitrageurs specialize in assessing the probability of deal consummation. Arbitrageurs bear the risk that the deal will be called off, causing a dramatic decline in the target's stock price and a commensurate loss for the merger arbitrageur, in exchange for the 1% to 3% price appreciation that successful completion of the merger will bring. Far from being "catastrophes" for merger arbitrageurs, deal failures are what allow arbitrageurs to profit from their strategy. If announced mergers were always completed, the difference between the target's stock price and the merger consideration would simply reflect the risk-free rate of return, and the investment opportunities for merger arbitrageurs would vanish. Like an insurance agent, merger arbitrageurs will demand a premium that provides adequate compensation for bearing the risk of loss associated with deal failure. This premium is the arbitrage spread, or the difference between the price at which they can purchase the stock and the price they anticipate receiving upon successful completion of the deal.

For some types of insurance, the risk of loss is idiosyncratic. The probability that one house will burn to the ground is usually uncorrelated with the probability that a house down the street will burn down. For other types of insurance, such as hurricane insurance, risks are concentrated; the probability that one house will be destroyed is highly correlated with the probability that the house down the street will be destroyed. Because idiosyncratic risk can be costlessly eliminated through diversification, understanding the correlation between various risks is critical to determining the appropriate price for insurance.

Merger arbitrage is similar. Often, the risk that one deal will fail is uncorrelated with the risk that other deals will fail. Furthermore, the risk of deal failure is usually, but not always, uncorrelated with overall stock market movements. For this reason, merger arbitrage is often referred to as a "market neutral" investment strategy. The degree of market neutrality will be discussed later in this chapter. For now, the important point is that merger arbitrage investors must maintain a portfolio perspective and understand the correlations between their individual investments, as well as the correlation of their portfolio returns with overall market returns.

This chapter begins by describing common types of mergers and the trades arbitrageurs use to capture the arbitrage spread. The precise trades used depend on the structure of the merger. The chapter then proceeds to describe the returns and the risks that are characteristic of portfolios of merger arbitrage investments.

MERGER ARBITRAGE TRADES

The trades used by merger arbitrageurs to assume deal risk and capture the arbitrage spread depend on the type of consideration being offered by the acquiring company. The most straightforward situation occurs when the consideration is cash. More complicated trading strategies are required when the acquirer offers securities (typically its own stock) in consideration for target shares. Descriptions of common trading strategies, and examples of common deal structures, are presented below.

Cash Mergers and Cash Tender Offers

The merger arbitrage trading strategy is most straightforward when the corporate acquirer offers cash for each share of the target company. Cash offers come in two flavors—tender offers and cash mergers. In a tender offer, the acquirer offers to buy target shares directly from target shareholders. In a cash merger, the acquirer makes a cash payment to the target company, and the target company distributes the cash to shareholders to retire the outstanding shares. While there are some important legal and tax-treatment differences between tender offers and cash mergers, the primary difference from the merger arbitrageur's perspective is that cash mergers take longer to complete than tender offers.

In both tender offers and cash mergers, the arbitrageur's trade is straightforward: buy the target company's stock after the deal is announced and hold it until the merger is consummated. Upon consummation, the target shares are exchanged for the merger consideration, generating a profit equal to the difference between the merger consideration and the price at which the target shares were purchased.

Coca-Cola's takeover of Odwalla, Inc., a distributor of juice drinks and snacks, provides an example of a cash tender offer. On October 22, 2001, rumors surfaced that Coca-Cola, Inc. was negotiating the purchase of Odwalla. Odwalla's stock price closed at $10.05 on the 22nd, an increase of 48% over its previous day's close of $6.80. Over the next five days, Odwalla's stock price drifted up to $11.83 as speculators assessed the probability that a definitive agreement would be reached and guessed at the terms of the transaction.

On October 30, 2001, Coke announced that it had reached a definitive agreement with Odwalla's board of directors whereby Coke would acquire all of Odwalla's publicly traded shares for $15.25 a share in a cash tender offer. The \$15.25 represented a 29% premium over Odwalla's stock price on the day before the merger was announced and a 144% increase over Odwalla's stock price in the days before rumors of the deal surfaced. At the close of trading on the day immediately following the announcement, Odwalla's stock traded at \$15.13, a 0.79% discount to the tender offer price.

Merger arbitrageurs could have invested immediately after rumors of the Odwalla deal surfaced. An arbitrageur (wishing to write insurance against negotiations falling apart) could have purchased Odwalla's stock for \$10.05 a share, hoping that a definitive agreement would materialize at a higher price. If an agreement were not reached, Odwalla's stock price would likely have dropped significantly, causing a substantial loss for the arbitrageur. As it turned out, a definitive agreement was reached at a price substantially higher than \$10.05 a share, so the arbitrageur would have made a return of 51% in six days.

This example shows that investing in rumors can pay off handsomely—or generate substantial losses. It is difficult to gauge both the probability that a definitive agreement will be reached and the price that will be offered if the agreement is reached. Many arbitrageurs therefore avoid investing in rumors, choosing instead to wait for the announcement of a definitive agreement.

An arbitrageur who waited for the announcement before investing in Odwalla would have purchased shares for \$15.13 a share, hoping to exchange them for the \$15.25 offer price, thereby capturing the 0.79% arbitrage spread. As Coke's tender offer for Odwalla was successfully consummated on December 11, 2001, 30 trading days after the definitive agreement was announced, the arbitrageur's 0.79% spread would have generated an annualized return of 6.8%.

Had Coke's tender offer for Odwalla been unsuccessful, Odwalla's stock price would most likely have dropped by several dollars. Given the severely asymmetric payoff to the merger arbitrage trade (i.e., make \$0.12 versus lose several dollars), the probability of successful completion of the merger would have to be much greater than the probability of failure for the arbitrage investment to have an expected return in excess of the risk-free rate. The arbitrageur can "back out" the market's assessment of the probability of deal failure by plugging estimates of both Odwalla's stock price in the event of deal failure and the time to deal completion into the following equation:

$$\frac{(1-p)(\text{Tender offer price}) + (p)(\text{Target price if failure})}{(1+r_f)^T} \tag{7.1}$$
$$= \text{Current target price}$$

Here p is the probability that the tender offer fails, r_f is the risk-free rate, and T is the estimated time required to complete the tender offer. For example, assume an annual risk-free rate of 5%. If we then estimate that Odwalla's stock would trade at $12 if the tender offer fails and that the deal will be completed in one month, the implied probability of deal failure is 1.8%. If instead we assume deal failure would result in a $10 stock price, the implied failure probability falls to 1.1%. Like the writer of insurance policies, the merger arbitrageur will invest in the merger only if the arbitrage spread (the "insurance premium") provides adequate compensation for bearing the risk of loss. Stated differently, the merger arbitrageur will buy Odwalla's stock only if his or her estimate of the probability of deal failure is lower than the probability reflected in market prices.

In this example, the expected cash flows from the investment in the Odwalla merger are discounted at the risk-free rate. The implicit assumption in this calculation is that the risk of deal failure is uncorrelated with overall market movements. Whether this is a good or bad assumption is treated later in this chapter.

Although the trades required to capture the arbitrage spread are more complicated when something other than cash is used as the merger consideration, the same basic principles apply. Merger arbitrageurs attempt to lock in the arbitrage spread when the spread provides adequate compensation for the risk of deal failure. The trades used to capture the spread when the acquirer offers stock instead of cash are described below.

Fixed Exchange Ratio Stock Mergers

On September 3, 2001, Hewlett Packard and Compaq Computer announced that they had reached an agreement whereby HP would acquire Compaq in a stock-for-stock transaction. The merger agreement specified that, upon consummation of the merger, each share of Compaq would be exchanged for 0.6325 share of HP. Because the 0.6325 exchange ratio was specified in the merger agreement and was not contingent on future events (e.g., changes in the acquirer's stock price), this type of merger is referred to as a *fixed* exchange ratio stock merger.

Capturing the arbitrage spread in a fixed exchange ratio stock merger requires a more complicated trading strategy than capturing the spread in a cash merger or tender offer. In addition to buying the target company's stock, the arbitrageur must sell short the acquiring firm's stock. In the HP–Compaq example, the arbitrageur would sell short 0.6325 share of HP for each share of Compaq purchased.

On September 4, 2001, one day after the merger was announced, Compaq closed at $11.08 and Hewlett Packard closed at $18.87. The arbitrageur would sell short 0.6325 share of HP, generating $11.94 (0.6325 × $18.87), and purchase one share of Compaq, costing $11.08. The $0.86 (7.8%) difference is the arbitrage spread. Upon successful consummation of the merger, each of the arbitrageur's Compaq shares is replaced with 0.6325 HP share. The arbitrageur would then be long 0.6325 share of HP and short 0.6325 share of HP. The long and short positions cancel out, leaving the arbitrageur with a profit equal to the original spread.

The example above ignores three cash flows that affect the ultimate profit generated by the merger arbitrage trade. First, the arbitrageur is long one Compaq share, hence is entitled to receive Compaq dividends. Second, the arbitrageur is short 0.6325 HP share, hence is obligated to pay HP dividends on 0.6325 share to the lender of HP stock. Third, the arbitrageur earns interest on the proceeds obtained from shorting HP stock. Interest is typically paid to the arbitrageur at a rate 25 to 50 basis points less than the federal funds rate and accrues over the period of time that the stock is shorted. Interest payments on short proceeds are often referred to as "short rebate."

Exhibit 7.1 shows the cash flows from the Compaq–HP arbitrage trade, assuming deal completion. An arbitrageur that placed the necessary trades on September 4 would have expected to earn a return of 7.8% if the merger was successfully consummated. Assuming an expected time to completion of 3.5 months, which is typical for fixed exchange ratio stock

EXHIBIT 7.1 **Cash Flows from a Merger Arbitrage Investment in the Hewlett Packard–Compaq Merger**

Transaction	Cash Flow
Purchase 1 Compaq Share, 9/4/01	–$11.08
Sell Short 0.6325 Hewlett Packard Share, 9/4/01	11.94
Pay Dividend on Hewlett Packard Short Position, 9/17/01	–0.05
Receive Dividend on Compaq Long Position, 9/26/01	0.025
Pay Dividend on Hewlett Packard Short Position, 12/17/01	–0.05
Receive Dividend on Compaq Long Position, 12/27/01	0.025
Pay Dividend on Hewlett Packard Short Position, 3/4/02	–0.05
Receive Dividend on Compaq Long Position, 3/4/02	0.025
Receive Interest on Short Proceeds ("Short Rebate")	0.20
Total Profit	$0.985
% Gain Excluding Dividends and Short Rebate	7.8%
% Gain Including Dividends and Short Rebate	8.9%

mergers, this would generate a 29.4% annualized rate of return. This may seem like a very high rate of return. However, at the time of the merger announcement, there was concern that the Federal Trade Commission (FTC) would block the merger on the grounds that it would adversely affect competition in the market for personal computers. If this were to happen, the arbitrageur's loss would far exceed the anticipated 7.8% gain. The arbitrageur would have estimated the *expected* return at the time of the deal's announcement as the weighted average of the positive return that would be realized upon deal completion and the negative return that would be realized upon deal failure, where the probabilities of consummation and failure are used as the weights.

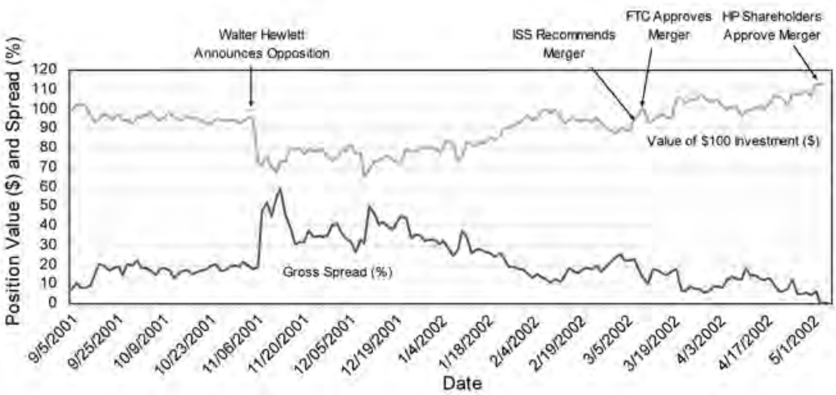
As things turned out, the FTC was little more than a warm-up act. On November 6, 2001, Walter Hewlett, son of HP founder William Hewlett and member of the HP board, made history by publicly announcing his intention to vote the shares under his personal control against the merger, and by commencing an aggressive proxy battle to block the merger. This particular proxy battle was uncommon because, as an HP board member, Walter Hewlett had voted for the merger. Hewlett's decision to personally fight the merger set the stage for a very public, often colorful, and frequently hostile debate between Hewlett and HP CEO Carly Fiorina. Both, for example, used daily *Wall Street Journal* advertisements to sway the shareholder vote.

For an arbitrageur, Hewlett's decision to fight the merger was unexpected and painful. On the day that he announced his opposition, HP's stock increased by $2.92 and Compaq's shares dropped $0.44. The arbitrage spread, originally 7.8%, immediately jumped to 47.4%. The arbitrageur's initial investment, originally worth $100, was now worth $72.

Exhibit 7.2 tracks both the arbitrage spread and the value of the arbitrageur's $100 initial investment from the time the merger was announced through consummation, eight months later. Throughout the process, the arbitrage spread expanded and contracted as arbitrageurs updated their beliefs about the likelihood of the merger being completed. This exhibit shows the direct relationship between the arbitrage spread and the arbitrageur's profits. When the arbitrage spread widens, the arbitrageur loses money on an arbitrage position that is already in place, and when the spread contracts, the arbitrageur makes money.

Ultimately, on May 3, 2002, after accusations of "vote-buying," lawsuits, and millions of dollars of advertisements, the Hewlett Packard–Compaq merger was completed. Including dividends paid on the HP short position, dividends received on the Compaq long position, and interest on short proceeds, the original arbitrage trade generated a return of 8.9%, for an annualized return of 14.0%.

EXHIBIT 7.2 Gross Arbitrage Spread and the Value of a $100 Merger Arbitrage Investment for the Hewlett Packard–Compaq Merger from Announcement through Consummation



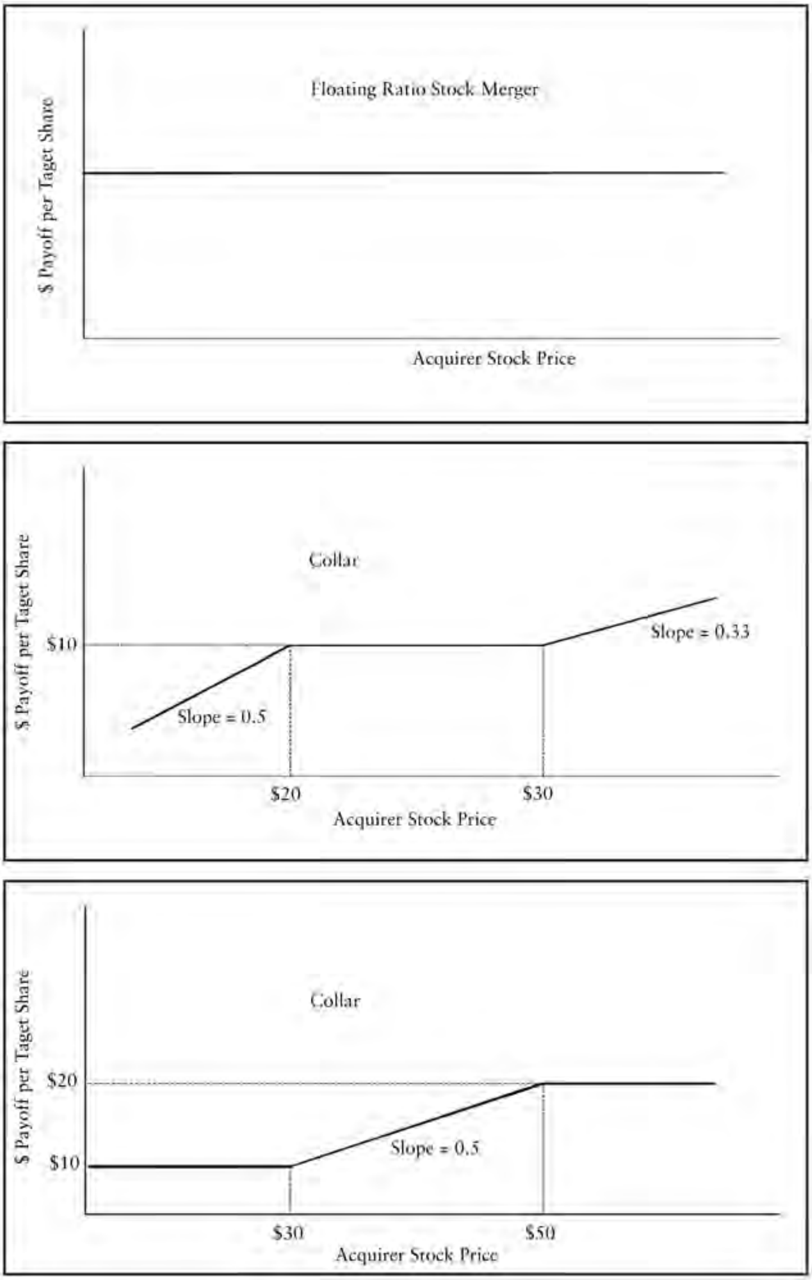
Contingent Exchange Ratio Stock Mergers

In a fixed exchange ratio stock merger such as Hewlett Packard–Compaq, the number of shares of acquirer stock to be exchanged for each target share is determined ex ante. In a contingent exchange ratio stock merger, the number of shares to be exchanged depends on the acquirer's average stock price over a prespecified period, usually close to the merger closing date. The period over which the acquirer's stock price is measured is referred to as the "averaging period" or "pricing period."

Contingent ratio mergers take many forms. Exhibit 7.3 illustrates three common forms. The top plot shows the structure for a floating exchange ratio stock merger, where each target share is promised a prespecified value of the acquirer's stock. The actual number of shares ultimately exchanged for each target share is determined by dividing the promised consideration by the acquirer's average stock price over the pricing period. If this average price is low, target shareholders receive a relatively large number of acquirer shares, whereas, if the price is high, target shareholders receive fewer shares. The variation in the number of shares maintains the value paid to target shareholders at a constant level.

Before the pricing period begins, floating exchange ratio mergers are like cash mergers, as the dollar value per target share is independent of the acquirer's stock price. The merger arbitrageur therefore buys the target stock but does not short the acquirer's stock. After the pricing period ends, when the number of acquirer shares to be paid for each target share has been determined, floating exchange ratio mergers are iden-

EXHIBIT 7.3 Payoff Diagrams for Floating Exchange Ratio and Collar Mergers



tical to fixed exchange ratio mergers. In order to capture the arbitrage spread and create a payoff that is independent of the level of the acquirer's stock price, the merger arbitrageur must establish a short position in the acquirer's stock. Thus, during the pricing period, the arbitrageur shorts the acquirer's stock and transforms the arbitrage investment from one that is like an investment in a cash merger into one that is like an investment in a stock merger.[1]

For an acquirer, a major risk of entering into a floating exchange ratio merger agreement is that the number of shares that must ultimately be issued can be very large. To mitigate this risk, merger agreements often augment the floating exchange ratio structure by placing limits on the number of shares that must be issued. These types of mergers are often referred to as "collars." The middle plot in Exhibit 7.3 illustrates a merger where each target share receives \$10 worth of acquirer shares as long as the acquirer's average price over the pricing period is between \$20 and \$30. If the average price falls below \$20, target shareholders receive a fixed consideration of 0.50 share. If the average price rises above \$30, the ratio is fixed at 0.33.

The bottom plot in Exhibit 7.3 depicts a different type of collar structure. Here a fixed number of acquirer shares is promised per target share as long as the acquirer's average stock price over the pricing period stays between \$30 and \$50. If the average price falls below \$30, additional shares will be issued to maintain a value of \$10 per target share. If the average price exceeds \$50, the value per target share is capped at \$20.

Collars often come with colorful labels. The collar depicted in the middle plot of Exhibit 7.3 is sometimes referred to as a "Travolta," a name that refers to the placement of John Travolta's arms when disco dancing in the movie *Saturday Night Fever*. In a similar vein, the collar depicted in the bottom plot is sometimes referred to as an "Egyptian," a reference to the way arms are drawn in ancient Egyptian hieroglyphics.

Collar mergers share attributes of both fixed exchange ratio stock mergers and floating exchange ratio stock mergers. Although they appear to be complicated, the payoffs to target shareholders in collar mergers can be replicated by portfolios of options on the acquirer's stock. Insulating the payoff from movements in the acquirer's stock price can be accomplished by hedging the payoff in the same way that option portfolios are hedged, namely, by trading in the option market or delta hedging using the acquirer's stock. Describing in detail the hedging strategies that can be used in collar transactions is beyond the scope of this chapter. However, the basic approach can be found in most derivatives textbooks.[2]

More complicated deal structures can involve preferred stock, warrants, debentures, and other securities. From the arbitrageur's perspective, the important feature of all these deal structures is that returns depend on mergers being successfully completed. Thus, the primary risk borne by the arbitrageur is that of deal failure.

INDIVIDUAL DEAL RISK AND RETURN

There are a number of sources of deal failure risk. Some of the factors an arbitrageur must analyze when determining the probability of an announced merger being consummated are enumerated below. Although not comprehensive, this list identifies sources of risk that are common across most mergers.

Execution of definitive agreements. In many cases, mergers are announced before the target and acquirer have agreed on all of the terms of the merger. For example, it is not uncommon for the merger to be announced after the price has been determined but before myriad other deal characteristics have been agreed upon. Only after all the merger terms have been agreed upon, including representations, warranties, and break-up fees, is the definitive agreement signed and submitted to the Securities and Exchange Commission (SEC). Many deals fail because, even after agreeing on a price, the merging parties cannot agree on other deal characteristics.

Ability of acquirer to obtain financing. The ability of the acquirer to obtain the financing necessary to buy the target company is most problematic in cash deals. If the acquirer does not already have the cash necessary to complete the deal, it must obtain equity or debt financing. If the acquirer's financial condition makes issuing debt or equity costly, there is a higher probability that the acquirer will back out of the deal.

Clearance of proxy material by the Securities and Exchange Commission. After drafting and signing, the definitive merger agreement is submitted to the SEC for review. The SEC seeks to ensure that the agreement is comprehensive and presents information regarding the merger in a format that is not misleading to investors. If the SEC deems the document to be incomplete or incomprehensible, it will return the document to the merging firms for revision. Although it is unlikely that the SEC review of the merger agreement will be the cause of deal failure, it can delay the merger consummation, decreasing the annualized return and allowing more time for some other event to undermine the transaction.

Blessing of the Federal Trade Commission and the Department of Justice. Antitrust considerations are some of the most important issues to address when estimating the probability of deal failure. The Sherman Act, passed in 1890, and the Clayton Act, passed in 1914, make business combinations that reduce competition illegal. Determining whether a business combination will reduce competition is the responsibility of the FTC and the Antitrust Division of the Department of Justice (DOJ). Under the Hart-Scott-Rodino Antitrust Improvement Act of 1976, parties to all mergers involving more than $50 million in consideration must notify the FTC and DOJ of their intentions to merge, and must supply the FTC and DOJ with information necessary to assess the effect of the merger on the level of competition. After the government agencies have been notified, they have 30 days (15 days in the case of a tender offer) to request additional information from the merging parties.[3] If additional information is not requested, the parties are free to merge without interference from the government. However, if the FTC or DOJ suspects that competition will be adversely affected, it can make a "second request." A second request can set off a lengthy negotiation between the merging firms and federal regulators. Often, remedies such as asset sales are agreed upon to mitigate anticompetitive issues. If the merging firms and the government regulators cannot reach agreement, the government will usually threaten to sue in federal court to obtain an injunction against the merger. Merging firms' most common response to a threatened lawsuit is to abandon the merger, in order to avoid the potentially enormous legal costs associated with fighting the U.S. government. In fiscal year 2000, the year that merger deal flow reached its highest level to date, 4,926 transactions were reported under Hart-Scott-Rodino and 98 (2%) received a second request. Over the 1991–2000 period, an average of 3% of reported transactions received a second request from the FTC or DOJ.[4]

Clearing other regulatory hurdles. In addition to the FTC and the DOJ, many other regulatory agencies may have to give their consent to a merger before it can be consummated. For example, firms doing substantial business in Europe must obtain approval from the European Union. Utility companies attempting to merge must obtain approval from both federal regulators and myriad state and local agencies. Insurance commissions, state and federal banking authorities, and the Committee for Foreign Investment in the United States are just a few of the other regulatory agencies that can affect the consummation of a proposed merger.

Civil legal impediments including patent suits, control issues, and union issues. In addition to equityholders, mergers affect many other stakeholders of the merging firms, including employees, creditors, customers, competitors, and suppliers. The propensity of these stakeholders to challenge the proposed merger both in the courts and in the press can significantly affect the probability of deal failure.

The sensitivity of the merger to movements in the macroeconomic environment. The 1998 Asian economic crisis provides a perfect example of this effect. In some industries, the Asian crisis fundamentally changed the economics of the merging firms and caused mergers to be renegotiated or terminated.

Deviations from expectations of the business performance of the target or the acquirer. The economic health of both the acquirer and the target are critical to the ultimate consummation of the merger. If the target's cash flows and future prospects deteriorate significantly during the merger process, the acquirer may attempt to renegotiate the merger terms so that a lower price is paid for the target company. If the deterioration in the target's future prospects is severe, the acquirer may walk away from the deal altogether. Similarly, if the acquirer's prospects deteriorate significantly while the merger is pending, the acquirer's managers may terminate the merger in order to focus on problems in their existing business.

A deterioration in the acquirer's position may at a minimum make it difficult for the acquirer to obtain financing for the merger. As discussed above, financing risk is greatest when the acquirer must access external funds to complete the acquisition. The difficulty of raising external capital increases as the performance of the acquiring company declines. Financing risk is greatly mitigated when the acquirer has ample internal funds for cash deals, or when the acquirer's stock is used as the form of payment. However, if stock is being used as the currency in the transaction, and the acquirer's stock price has decreased significantly in value since the deal was announced, the target may attempt to renegotiate or terminate the transaction. If renegotiation would cause a significant increase in the number of shares to be issued, and if the acquirer's managers believe the stock is undervalued, they may terminate the merger to avoid dilution of their shareholders' interests.

Returns

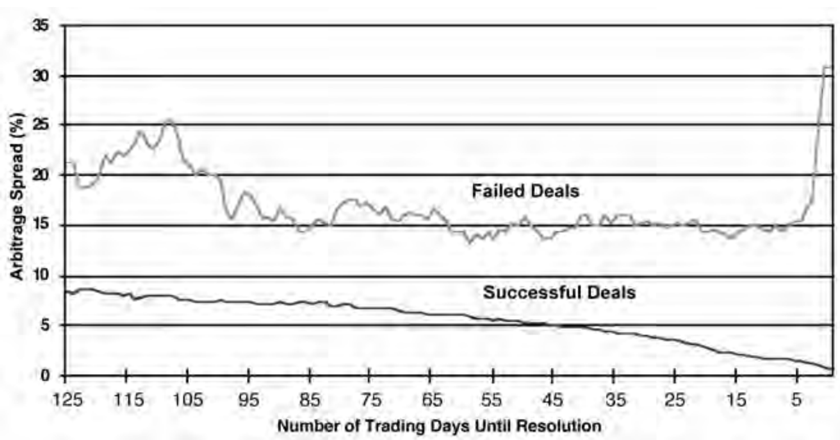
Returns from merger arbitrage investments are skewed. If the merger is successfully consummated, the arbitrageur makes a small amount of money. If the merger fails, the arbitrageur loses a lot of money. Consider a cash merger that is contingent on the acquirer obtaining financing. If, because of an overall fall in the stock market, the acquirer is unable to obtain financing and is forced to call off the merger, the arbitrageur's long position in the target company will depreciate, both because of the failed merger and also because of the decline in the stock market. In failed stock mergers, the arbitrageur can also lose money on its short position, as it is not uncommon for the acquirer's stock price to increase following the announcement of the failure of a deal.

To measure the distribution of returns generated by merger arbitrage investments, Mitchell and Pulvino assembled and analyzed a sample of mergers that contains virtually every announced takeover of a U.S. public target from 1963 through 1998.[5] Results from their analysis indicate that, on average, successful mergers generate a return of 9.9% over an average 3.5-month period while failed mergers generate a return of –18.8% over an average 2.5-month period. Fortunately for arbitrageurs, failures were much less frequent than successful mergers over this period.

The data also reveal interesting differences in deal types across time. In the late 1980s, an unusually large percentage of announced mergers were hostile cash deals. Unlike friendly mergers, which have a probability of deal failure of less than 10%, hostile deals have, on average, a 30% chance of failing. Consistent with this high failure probability, arbitrageurs demand higher spreads for hostile deals. A wider spread implies a greater profit if the deal is successful, and a smaller loss if the deal fails.

Exhibit 7.4 shows the evolution of the median arbitrage spread between announcement and consummation or failure for both successful and failed mergers. For failed mergers, the spread remains relatively wide during the life of the merger. When a deal fails, the median spread widens dramatically, increasing from 15% to more than 30% on the termination announcement day. A very different pattern exists for merger arbitrage investments in successful transactions. In successful deals, the

EXHIBIT 7.4 **Median Gross Arbitrage Spread (excluding dividends and short rebate) for Failed and Successful Stock Mergers, 1963–1998**



Source: Mark Mitchell and Todd Pulvino, *The Journal of Finance* (December 2001), p. 2139. Reprinted with permission from Blackwell Publishing.

arbitrage spread decreases continuously as the deal resolution date approaches. Upon successful consummation of the merger, the spread collapses to zero.

The fact that spreads are much wider for unsuccessful transactions than for successful ones suggests that the arbitrage community accurately identifies risky deals and incorporates the risk into target and acquirer stock prices well before announcement of deal failure. At the same time, the sudden widening of the arbitrage spread just before deal failure suggests that the arbitrage community, while it does a good job identifying the risky deals, is generally surprised by merger failures. The data provide scant evidence to support the notion that "well informed" arbitrageurs are able to exit their positions before news of the deal failure becomes public.

PORTFOLIO RISK AND RETURN

Although there is clearly a great deal of risk in individual merger arbitrage investments, risk at the portfolio level is more relevant for most investors. If gains from some merger arbitrage positions offset losses from other positions, the portfolio will have far lower risk than individual positions.

There are two approaches that can be used to examine portfolio-level risk and return. The first approach is to examine historical returns generated by active arbitrageurs. The advantage of this approach is that the data represent returns that could have been realized after taking market frictions (e.g., transaction costs) into account. The disadvantage is that it is difficult to control for the levels of leverage and diversification in the active managers' portfolios, both of which can change rapidly.

The effect of leverage is straightforward: it amplifies both positive returns and negative returns. Leverage can magnify a slight appreciation in the value of assets into genius-like returns. It can also magnify small losses on underlying assets into huge losses on the leveraged portfolio. Diversification can have a similar effect. A portfolio that is not well diversified will exhibit extreme positive and negative returns compared with a diversified portfolio. A compounding problem is that merger arbitrageurs sometimes dabble in other investment classes, such as distressed debt, so that portfolio returns may reflect *manager* risk rather than *strategy* risk.

The second approach for evaluating merger arbitrage returns is to follow academic literature and examine portfolio returns simulated from individual merger data. Because these returns are free from financial leverage, and because diversification constraints can be imposed, simulated returns better reflect strategy risk. The problem with this approach is that simulated returns may not accurately reflect the market frictions that are present when actually investing in merger arbitrage positions.

As both actual hedge fund returns and simulated returns have deficiencies, this section presents returns based on both. Merger arbitrage hedge fund returns are obtained from Hedge Fund Research and simulated portfolio returns are obtained from Mitchell and Pulvino.[6]

Portfolio Risk

As is the case with most assets, merger arbitrage portfolio investments contain two types of risk—systematic and idiosyncratic. Because investors can costlessly diversify away the idiosyncratic component, they should, theoretically, receive compensation only for bearing the systematic component.

The most common measure of systematic risk is beta, which measures the covariance between portfolio returns and market returns. A portfolio with a beta close to zero is one with little systematic risk. A portfolio with a beta of 1.0 has the same systematic risk as the market, and a portfolio with a beta greater than 1.0 has more systematic risk than the market. According to the capital asset pricing model (CAPM), investors will demand higher expected returns from portfolios with higher betas (higher systematic risk) and lower expected returns from portfolios with lower betas (lower systematic risk).

One way to estimate the beta of a merger arbitrage portfolio is by calculating coefficients in the following regression equation:

$$r_{\mathrm{MA},\,t} - r_{f,\,t} = \alpha + \beta(r_{\mathrm{S\&P},\,t} - r_{f,\,t}) + \varepsilon_t \qquad (7.2)$$

where $r_{\mathrm{MA},t}$ is the monthly return from a portfolio of merger arbitrage investments, $r_{f,t}$ is the Treasury bill rate at time t, $r_{\mathrm{S\&P},t}$ is the monthly return to the S&P 500, and ε_t is the error term. Beta in this equation measures the covariance of merger arbitrage returns with market returns. If merger arbitrage is indeed market neutral, then beta should be indistinguishable from zero. The constant term, alpha, provides a measure of excess return generated by merger arbitrage after controlling for systematic risk. Assuming that the CAPM is the appropriate model to estimate the risk in merger arbitrage, and assuming that the market is efficient, alpha should be indistinguishable from zero.

Exhibit 7.5 presents results from estimating equation (7.2). The equation is estimated using monthly returns from Hedge Fund Research (HFR) for 1990–2001 and monthly returns simulated from the Mitchell and Pulvino database of individual mergers for the 1963–1998 period.[7] The beta calculated using HFR returns is 0.14, which suggests that merger arbitrage returns have little systematic risk. Similar results are

EXHIBIT 7.5 **Examination of Merger Arbitrage Returns Using the Capital Asset Pricing Model**

	Intercept	Beta	Adjusted R^2	Number of Observations (months)
Hedge Fund Research Returns (1990–2001)	0.0048 (4.91)	0.1418 (6.34)	0.21	144
Simulated Returns (1963–1998)	0.0029 (2.90)	0.1232 (5.22)	0.06	432

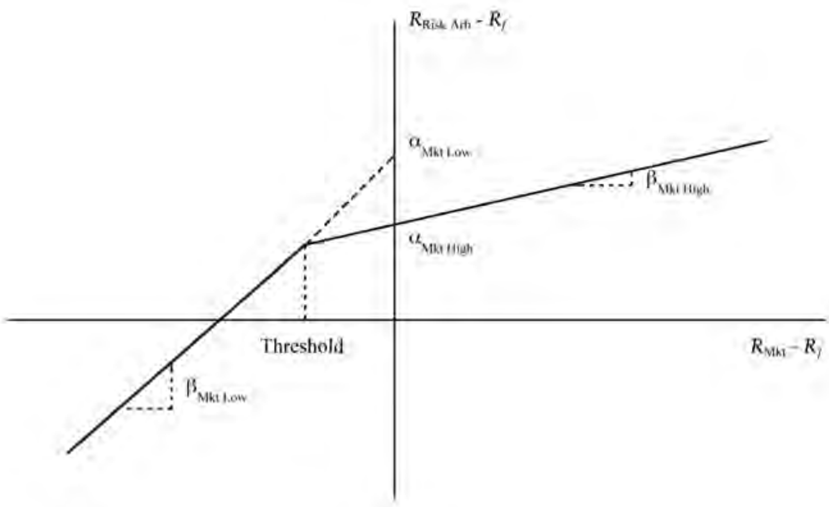
obtained when simulated returns are used. Over the 1963–1998 period, the estimated beta using simulated returns is 0.12.

These results suggest that merger arbitrage returns have a very low correlation with market returns. However, a closer examination of the data suggests that this might not be the case. The data show a high correlation between merger arbitrage returns and market returns in months when market returns are significantly negative. For example, when the market crashed in October 1987, generating a one-month return of –22%, simulated returns were –8.2%. Similarly, the financial crisis in August 1998, triggered by the Russian government's default and the fall of the large hedge fund Long-Term Capital Management, generated a one-month market return of –15%, a simulated merger arbitrage return of –4.5%, and an HFR merger arbitrage return of –5.7%. Again, in September 2001, both the market return and merger arbitrage returns were significantly negative.

These results suggest that, rather than a linear model such as the CAPM, a nonlinear model that captures the high correlation between merger arbitrage and the market in down markets, and the lack of correlation in flat and appreciating markets, might be more appropriate. Exhibit 7.6 illustrates an alternative model that allows beta to take different values in up and down markets. As in the linear model described above, coefficients in this model can be estimated using regression analysis. In this case, three coefficients need to be estimated—the down-market beta, the up-market beta, and the intercept. In addition, one must choose a threshold that defines the boundary between down markets and flat or appreciating markets.

Exhibit 7.7 presents results from estimating the nonlinear model of merger arbitrage returns using both HFR returns and simulated returns. While the estimated up-market beta is close to zero in all cases, the down-market beta is significantly greater than zero. For example, using HFR returns over 1990–2001, the down-market beta estimate is 0.44, more

EXHIBIT 7.6 **Nonlinear Model of Systematic Risk in Merger Arbitrage**



Source: Mark Mitchell and Todd Pulvino, *The Journal of Finance* (December 2001), p. 2143. Reprinted with permission from Blackwell Publishing.

EXHIBIT 7.7 **Examination of Merger Arbitrage Returns Using a Piecewise Linear Regression Model**

	Intercept	Down-Market Beta	Up-Market Beta	Adjusted R^2	Number of Observations (months)
Hedge Fund Research Returns (1990–2001)	0.0069 (6.82)	0.4394 (6.69)	0.0554 (2.01)	0.32	144
Simulated Returns (1963–1998)	0.0053 (4.82)	0.4920 (7.31)	0.0167 (0.57)	0.12	432

than three times the estimate obtained using the CAPM. The t-statistic of 6.7 indicates that the 0.44 beta is significantly different from zero. While this beta is significantly greater than the beta calculated using all months, it is still relatively low and is only slightly larger than the beta observed for investment grade corporate bonds.[8]

In a nonlinear model of the relationship between merger arbitrage returns and market returns, the coefficient estimates have different interpretations than in a linear world. In particular, the alpha can no longer be interpreted as an excess return. Rather, it is an insurance premium that is collected by arbitrageurs in months when the stock market is flat and appreciating. For the privilege of collecting this insurance premium, arbitrageurs pay large claims in months when there are severe market dislocations.

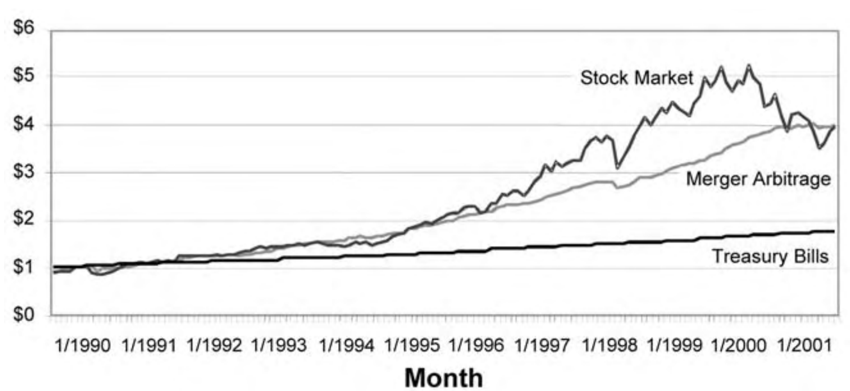
Accurately controlling for the risk in merger arbitrage is more complicated than simply calculating beta from a CAPM-type regression. Merger arbitrage is akin to selling out-of-the-money put options on the market (another insurance strategy). Therefore, merger arbitrage returns should be compared with returns from selling put options. Any return obtained in excess of the return obtained from selling put options can be viewed as excess return.

Portfolio Returns

The above discussion suggests that merger arbitrage has a positive beta when a positive beta is least desired—in down markets. In up markets, when a positive beta is welcome, merger arbitrage has a beta close to zero. The saving grace is that, in most months, merger arbitrage generates a positive insurance premium. The question remains whether this premium is large enough to offset the claims that must be paid in severely depreciating markets.

Exhibit 7.8 shows the growth in value of $1 invested in merger arbitrage in January 1990. Also shown are the values of $1 invested in the stock market and $1 invested in Treasury bills. This exhibit shows that

EXHIBIT 7.8 **Growth of $1 Invested on December 30, 1989 in Merger Arbitrage and the Stock Market (CRSP Value-Weighted Index)**[a]



[a] Merger arbitrage returns obtained from Hedge Fund Research and compounded monthly.

the strategy generated attractive returns. The compound annual return over this 12-year period was 12.2%, with a standard deviation of 4.5%. By comparison, the compound annual return on the market was 12.1%, with a standard deviation of 14.9%. Over the 1990–2001 period, merger arbitrage generated the same returns as equities, with much less volatility.

Although compound annual returns and standard deviations suggest that merger arbitrage is an attractive strategy, these measures do not address the short put feature of merger arbitrage returns. Doing so requires comparing merger arbitrage returns with the returns to a "replicating portfolio" comprised of short positions in out-of-the-money index put options. Using option data from 1987–1996, Mitchell and Pulvino estimate that merger arbitrage generated excess returns of approximately 4% per year.[9]

Excess returns, as well as up- and down-market betas, will generally differ across different merger arbitrage funds, depending on the levels of leverage and diversification employed by individual managers. Investors can nevertheless apply the nonlinear framework described above to individual portfolios in order to better understand the risks taken and value added by merger arbitrage.

IMPLEMENTATION ISSUES

There are, in general, two types of merger arbitrage funds. One type holds relatively concentrated positions. Concentrated fund managers believe that their competitive advantage lies in their superior abilities to uncover and interpret information related to the probability that a given merger will be consummated. To outperform their peers, such managers must have information that is superior not only to the information held by individual peers, but also to the aggregate information reflected in stock prices. The massive amount of resources that must be allocated to analyzing mergers, and the limited number of mergers available to invest in at any given time, makes this a difficult task.

The other type of merger arbitrage hedge fund holds a diversified portfolio. In a diversified fund, maximum position sizes are limited to, say, 5% of the overall portfolio. Obtaining and analyzing information is important for diversified funds, as it helps the arbitrageur to estimate correlations between individual investments and to assess the risk of the overall portfolio. However, information is much less valuable for diversified funds than it is for concentrated funds that attempt to identify mispriced merger stocks.

For both types of funds, incorporating the constant flow of new information into an investment process that can capture the premium available on merger arbitrage requires a complete business structure. Arbitrageurs must have capabilities in financial analysis, financial modeling, legal analysis, and trading. For example, a solid understanding of corporate finance and accounting is often necessary to estimate the level at which target and acquirer stocks will trade if the merger fails. Financial analysis and modeling skills are required to analyze complex mergers involving collars, warrants, preferred stock, and other forms of payment. Trading capabilities, while often viewed as less important than analytical capabilities, can have significant effects on merger arbitrage profits, because arbitrage spreads are typically so small. Minimizing transaction costs and thereby maximizing returns requires an understanding of market microstructure and an ability to monitor order flow. Finally, because merger agreements are lengthy and complicated legal documents, and because, under antitrust laws, every merger must be reviewed by antitrust authorities, arbitrageurs must be familiar with regulatory and contractual legal issues.

Although the list of required skills might seem long, the arbitrage community, like most other industries, outsources much of the work. Legal and regulatory consultants, industry experts, corporate contacts, Wall Street analysts and traders, and other outside professionals are commonly hired to help the arbitrageur understand the risks and returns of individual deals. A primary responsibility of the merger arbitrage portfolio manager is to aggregate the input on individual deals in order to manage overall portfolio risks. This requires continuous monitoring of portfolio attributes such as sector concentrations, correlations between individual investments, and expected losses in the event of deal failure.

As discussed above, merger arbitrage returns are for the most part immune to overall market movements, except when there is a large negative market return. If the underlying market shift is great enough to cause deals to be terminated, the resultant loss can be much greater than initially anticipated. An example of this occurred in 1994, when the Federal Reserve unexpectedly increased interest rates. This caused many deals involving financial stocks to be terminated, just as stock prices in the financial sector declined. Arbitrageurs suffered losses not only because of the deal terminations, but because the prices of the financial stocks involved fell below even their predeal levels. Arbitrageurs that had not accounted for the correlations between financial sector deals found out that their seemingly well-diversified portfolios were actually highly concentrated.

Capturing the risk premium in merger arbitrage also requires critical mass. Costs associated with research and analysis are substantial and essentially fixed in nature. Large arbitrage funds can achieve economies of scale by allocating these fixed costs across more investment dollars. Large fund size also facilitates short selling. To sell a stock short, a fund must first borrow the shares. When a stock is difficult to borrow, brokerage firms often allocate scarce shares to their best clients, which tend to be large funds that are frequent short sellers. Very small arbitrageurs can be at a disadvantage compared with those that have achieved a critical mass.

CONCLUSION

The term merger arbitrage often evokes images of savvy investors, such as Ivan Boesky, who trade using information available only to an elite few. However, this image is more applicable to felons than merger arbitrageurs. Most merger arbitrageurs trade using public information that is available after a merger is announced, not before. They attempt to generate profits by building portfolios in which the small profits made in most merger investments outweigh the large losses that occur in the few failed investments. Like the writer of fire insurance, the merger arbitrageur makes a living by writing insurance—in this case, against deal failure. As in other lines of insurance, success in merger arbitrage requires good actuarial tables; arbitrageurs must be able to estimate the probability of deal failure, downside risks, and correlations between individual investments.

As in any market, short-run returns in merger arbitrage reflect the equilibrium between the supply of investable deals and investor demand for exposure to the strategy. The supply of mergers is driven by structural changes in world economies and industries. The rapid development of new technologies produces a situation where mature companies, with established distribution channels and significant financial resources, acquire younger companies that lack these attributes but have valuable products and services. With the proliferation and growth of entirely new industries, multibillion-dollar deals involving companies and industry sectors that did not even exist a few years ago are announced with some regularity. However, if the future is anything like the past, the supply of merger arbitrage investments will remain cyclical. In booming economies, both the number of mergers and the value of mergers will increase. During recessions, merger frequency and value will decline.

On the demand side, market turmoil such as that experienced in August and September of 1998, when Long-Term Capital Management failed, and in the aftermath of the September 11 tragedy, can lead to large losses at arbitrage funds and proprietary trading desks. In response to these losses, many shops close down or significantly reduce their investment levels. As investors flee and continue to shun arbitrage trading, arbitrage spreads eventually widen, attracting new capital into the strategy. Like supply, demand in the merger arbitrage market is cyclical, and can cause short-run returns to fluctuate around the long-run level that compensates investors for the systematic risk that stems from the possibility of deal failure.

NOTES

[1] For a description of contingent ratio stock mergers and the effects of arbitrage trading on stock prices around mergers, see Mark Mitchell, Todd Pulvino, and Erik Stafford, "Price Pressure Around Mergers," *The Journal of Finance* 59 (2004), pp. 31–63.
[2] See, Robert McDonald, *Derivatives Markets* (New York: Addison Wesley, 2003).
[3] Additional information regarding premerger notification can be obtained from the Premerger Notification Office, Bureau of Competition, Federal Trade Commission. A summary of the premerger notification rules can be found in the FTC's publication, "Introductory Guide I to the Premerger Notification Program."
[4] Federal Trade Commission and Department of Justice Antitrust Division, *Annual Report to Congress*, Fiscal Year 2000, Pursuant to Subsection (j) of Section 7A of the Clayton Act, Hart-Scott-Rodino Antitrust Improvements Act of 1976 (Twenty-Third Report) (Washington, DC: U.S. Government Printing Office, 2000).
[5] Mark Mitchell and Todd Pulvino, "Characteristics of Risk and Return in Risk Arbitrage," *The Journal of Finance* 56 (2001), pp. 2135–2176.
[6] In calculating simulated returns, the simulated portfolio is constrained so that no single position comprises more than 5% of the total portfolio value. Furthermore, the portfolio is constrained to have zero leverage (defined to be total long value/equity capital minus one). In periods of low deal flow, the simulated portfolio invests excess cash in the risk-free security. Calculated returns include dividends, interest paid on short proceeds, and transaction costs. See Mitchell and Pulvino, "Characteristics of Risk and Return in Risk Arbitrage," for a more complete description of the simulation procedure.
[7] See Mitchell and Pulvino, "Characteristics of Risk and Return in Risk Arbitrage."
[8] See Eugene Fama and Kenneth French, "Common Risk Factors in the Returns on Bonds and Stocks," *Journal of Financial Economics* 33 (1993), pp. 3–56.
[9] See Mitchell and Pulvino, "Characteristics of Risk and Return in Risk Arbitrage."

CHAPTER 8

Transporting Alpha

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

Market neutral portfolios are constructed to offer a return from active security selection (the net return from long and short positions) that is independent of—that is, uncorrelated with—the performance of the broad market from which the securities were selected. Thus market neutral equity strategies should deliver a positive return even if the S&P 500 or other equity market benchmark declines. Similarly, market neutral portfolios of mortgage-backed securities are designed to achieve a positive return whether underlying interest rates rise or fall. And convertible arbitrage strategies are constructed to offer a return independent of underlying equity returns (and, in many cases, interest rates).

This active return is often called "alpha." Most people think of alpha in terms of excess return relative to an underlying market or market benchmark. One might therefore be tempted to think of the alpha of a market neutral equity portfolio or a merger arbitrage portfolio as the difference between the portfolio's return and the equity market's return, or the alpha of a fixed income portfolio as the excess (or shortfall, if the alpha is negative) relative to a benchmark bond return. This is not the case, because market neutral construction essentially eliminates exposure to the market from which the portfolio's constituent securities are selected. The return from the security selection component of a market neutral strategy is more appropriately measured in terms of the cash return, as proxied by the short rebate on the proceeds from the securities sold short and the interest earned on the liquidity buffer. Portfolio performance thus reflects the manager's ability to enhance, via active security selection, a cash return (at the cost of added risk).

However, the alpha from a market neutral strategy can be combined with derivatives positions to create an overall structure that offers a representative market benchmark return plus the alpha from the market neutral portfolio. For example, a market neutral equity strategy combined with futures contracts on the Standard & Poor's 500 Index (S&P 500) will provide an equity market return (and risk) plus the active return (and risk) from the securities selected for the market neutral portfolio. Similarly, a market neutral sovereign fixed-income strategy can be combined with futures on U.S. Treasury, German government, Japanese government, or other bonds to offer a representative fixed income exposure plus the active return (and risk) from the bonds selected for the market neutral portfolio. In place of appropriate futures contracts (or in their absence), a desired market exposure may be attained via swaps.

There is no inherent reason why the derivatives used must offer exposure to the same market from which the securities in the market neutral portfolio are selected. A fixed-income market neutral strategy, for example, can be combined with stock index futures to establish an equity market exposure. In this way, the return available from the active selection of securities from one market can be transferred to an entirely different market.

Given the "transportability" of the alpha from market neutral strategies, the strategies can provide invaluable tools for tailoring overall portfolio risk and return. They can be used to create enhanced passive portfolios designed to provide an active return on top of a passive benchmark return. A more aggressive approach might entail combining a market neutral portfolio with a benchmark exposure that varies in line with expectations for the benchmark's performance.

Perhaps the most promising aspect of the transportability of market neutral alpha is that it allows the investor (and the manager) to separate security selection skills from asset allocation decisions. Thus the talents of a manager particularly skilled in stock selection need not be confined to an equity market allocation; they can be transported to virtually any asset class via derivatives. The manager's ability to add value, and the investor's choice of managers, need not be constrained by the investor's asset allocation needs.

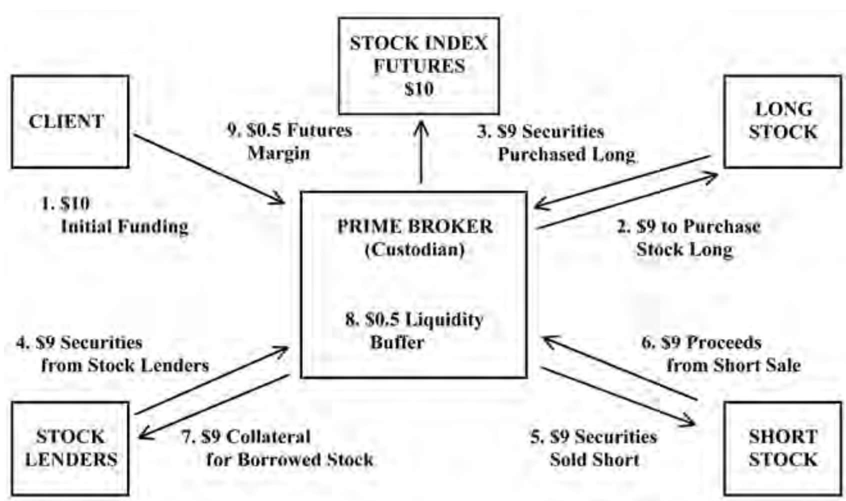
Below, we examine alpha transport in the context of market neutral equity strategies. The general concepts are applicable to all the market neutral strategies discussed in this book. The key to alpha transport is the ability to generate active performance that is independent of the underlying asset class.[1]

MECHANICS: TRANSPORTING ALPHA FROM A MARKET NEUTRAL EQUITY STRATEGY

Market neutral construction eliminates exposure to the underlying market index's risk—and its return. This return, and its associated risk, can be added back by purchasing derivatives, such as futures or swaps, in an amount equal to the invested capital. In the case of a market neutral equity portfolio, for example, the investor can purchase stock index futures to recover exposure to an equity index. The return to the resulting "equitized" market neutral portfolio will basically reflect the market return (the change in the price of the futures contracts) plus the active return (the long-short spread) from the market neutral portfolio. The equitized portfolio will retain the flexibility benefits of market neutral construction, as reflected by the long-short spread, while also participating in overall market movements.

Exhibit 8.1 illustrates the deployment of capital for equitized construction. This may be compared with Exhibit 3.1 in Chapter 3, which

EXHIBIT 8.1 Equitized Market Neutral Deployment of Capital (millions of dollars)



Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

illustrates the same for the basic market neutral equity strategy. Here, again, we assume the investor deposits $10 million with the custodial prime broker. Again, $9 million of the initial $10 million is used to purchase desired long positions, which are held at the prime broker. This broker also arranges to borrow $9 million in securities to be sold short. Upon their sale, the broker provides the $9 million in proceeds to the securities' lenders as collateral for the shares borrowed.[2]

As with the market neutral equity strategy, the investor is subject to Federal Reserve Board Regulation T. Under "Reg T," which covers common stock, convertible bonds, and equity mutual funds, the combined value of long and short positions cannot exceed twice the value of the equity in an account.[3] The investor must also retain a liquidity buffer. With the equitized strategy, however, the investor must also purchase futures—on the S&P 500, say—with a face value of $10 million. As the futures can be purchased on margin, the investor's outlay will be about 5% of the face value purchased (or about $0.5 million in Treasury bills). This expenditure comes out of the liquidity buffer, leaving it at a level of $0.5 million.

As with the basic market neutral strategy, the shares borrowed to sell short must be fully collateralized. If they increase in value, the investor will have to arrange payment to the securities' lenders so collateral continues to match the value of the shares shorted. If the borrowed shares fall in value, the money will flow in the opposite direction, with the lenders releasing funds to the investor's prime broker account. These payments flow to and from the investor's liquidity buffer daily.

With an equitized strategy, however, the investor also experiences marks to market on the futures position. These will tend to offset the marks to market on the shares borrowed. An increase in the price of the short positions induced by a rise in the overall market, for example, should be accompanied by an increase in the price of the futures contracts held long. The marks to market on the futures can thus be used to offset the marks to market on the shorts.

This is illustrated in Exhibit 8.2. Here, we assume that the long and short positions, as well as the futures position, double in value. The investor will now owe the securities' lenders $9 million on the marks to market on the borrowed shares. But the investor's account will also receive a $10 million positive mark to market on the futures position. The securities' lenders can be paid out of this $10 million, with $1 million left over.

Of course, the futures position, having doubled its initial value, is now undermargined by $0.5 million (assuming futures percentage margins remain the same). Purchasing an additional $0.5 million in Treasury bills to meet the futures margin leaves the investor with $0.5 million. This is added to the liquidity buffer, which is now increased in line with the value of the invested positions.

EXHIBIT 8.2 Trading Required When Securities, Long and Short, and Futures Rise 100% (millions of dollars)

	Initial Values	Return	Gain/Loss	Owe/Owed	New Values	Action	After-Action Values
Long	$9	+100%	+$9		$18		$18
Short	$9	+100%	–$9	Owe lenders $9	$18		$18
Cash	$0.5				$1.5		$1.0
Equity	$9.5				$19.5		$19.0
Margin	52.8%				54.2%		52.8%
Futures	$10 + $0.5 in Treasury bills	+100%	+$10	Owed $10 on mark to market	$20 + $0.5 in Treasury bills	Buy $0.5 in Treasury bills	$20 + $1.0 in Treasury bills

Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

The mechanics of equitized market neutral portfolio construction thus differ from basic market neutral construction in the addition of the futures position and the interaction between the marks to market on the futures and on the short positions. Because of the tendency of the marks to offset, the equitized market neutral strategy does not require as large a liquidity buffer as the basic market neutral equity portfolio. In addition, the equitized portfolio is less likely to have to engage in trading in order to meet marks to market on the borrowed shares.

Of course, the fundamental differences between the equitized and the market neutral portfolios emerge in the differing responses of their return and risk levels to movements in the underlying market. These are discussed below.

Bull and Bear Markets

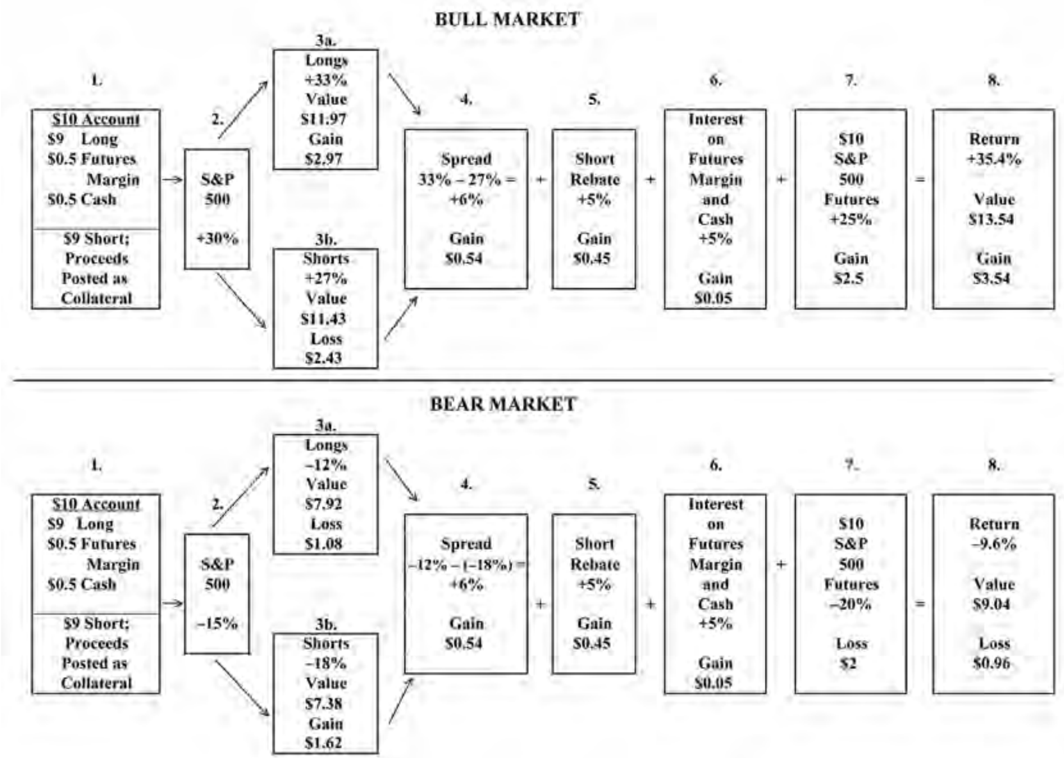
Exhibit 8.3 illustrates the performance of the equitized strategy in both bull and bear markets. This may be compared with Exhibit 3.2 in Chapter 3, which illustrates the same for the basic market neutral equity strategy. Again, we assume that the market either rises by 30% or falls by 15%.

First, it is evident that, unlike the market neutral portfolio, the equitized market neutral portfolio does reflect market movements. It has a return of 35.4% in the bull market (versus 10.4% for the market neutral portfolio) and a return of –9.6% in the bear market (versus 10.4% for the market neutral portfolio). The return, and risk, associated with exposure to the broad equity market have been added back. The portfolio can be expected to enjoy gains in bull markets and suffer losses in bear markets.

Perhaps less evident, but extremely important, is that the portfolio retains the value-added provided by market neutral construction. The long-short spread of 5.4%, the same as in the market neutral case, adds to the equitized portfolio's return in the bull market and reduces the portfolio's loss in the bear market. This incremental return reflects the active return to security selection, which benefits from the added flexibility market neutral construction offers in the pursuit of return and control of risk. (Of course, if the long positions in the market neutral portfolio had, contrary to expectations, underperformed the short positions, the long-short spread would be negative, and the active return from the market neutral portfolio would detract from the equitized portfolio's performance.)

This result underlines one of the major benefits of market neutral portfolio construction and the gist of alpha transport—the transportability of the active return from the basic market neutral portfolio. The active return

EXHIBIT 8.3 Hypothetical Performance in Bull and Bear Markets (millions of dollars)



Source: Bruce I. Jacobs and Kenneth N. Levy, "The Long and Short on Long-Short," *Journal of Investing* (Spring 1997).

on the market neutral portfolio represents a return to security selection alone, independent of the overall return to the equity market from which the securities are selected. This return reflects all the benefits of market neutral construction. The equitized market neutral portfolio transports this return to the equity asset class, adding the security selection return (and its associated risk) to the equity market return (and its risk).

Uses of Alpha Transport

In the above example, the equity market exposure achieved via derivatives can be likened to a passive position in an equity index. Institutional investors often seek passive exposures. The popularity of passive investing reflects in part the emergence in the 1980s of theories such as the Efficient Market Hypothesis and random asset pricing, which implied that active investing, including attempts to identify and exploit security undervaluation (and overvaluation), were futile. Perhaps even more important to the growth of passive investing was the accumulating data showing that active management generally failed to add value vis-à-vis underlying asset benchmarks, especially after management fees and trading costs were taken into account.[4]

Passive portfolios, by contrast, demonstrated an ability to deliver on a consistent basis performance comparable to representative asset classes or subsets of asset classes. But passive investing is insightless; it does not pursue alpha. Furthermore, trading costs and management fees, although modest, subtract from passive performance. Combining a market neutral portfolio, with an expected positive active return, and a passive exposure that reflects the risk and return of a desired benchmark has the potential to boost overall portfolio return without a substantial increase in risk. Given the size of most institutional portfolios, even a 1 or 2 percentage point return from security selection in the market neutral portfolio can translate into large dollar gains, especially over time.

Furthermore, the investor can choose to take a more aggressive stance toward benchmark positions. For example, the investor can choose to reduce (increase) derivatives positions if the underlying market is expected to decline (rise). This would incorporate an element of market timing (and additional risk) into the market-neutral-plus-derivatives construct.

In Jacobs, Levy, and Starer, we explain how to optimize the utility of a portfolio that combines a position in a desired benchmark with long and short positions in benchmark securities.[5] As with the market neutral equity portfolio, the answer lies in integration: portfolio construction considers explicitly the risks and returns of the individual securities and the benchmark holding, as well as their correlations.

TRANSFERRING ALPHA: MAXIMIZING SECURITY SELECTION AND ASSET ALLOCATION

Over 90% of an average pension fund's total return variance can be traced to its investment policy—the long-term allocation of its investments across asset classes.[6] Even within asset classes, the allocation of a portfolio across subsets of the asset class can explain a large portion of the portfolio's return. For 1985–1989, for example, over 97% of the returns to a fund known for stock selection—Fidelity Magellan Fund—were mirrored by a passive fund invested in large-cap growth stocks (46%), median-sized stocks (31%), small-cap stocks (19%), and European stocks (4%).[7]

Ideally, investors should be able to maximize both security selection and asset allocation. That is, they should be able to find skilled managers for each of the asset classes they choose to hold. In practice, however, the task of combining asset allocation with security selection often involves a tradeoff. That is, the investor may be able to find active managers who have demonstrated an ability to add value, but the universes exploited by these managers may not encompass the asset class desired by the investor. Given the presumed priority of the asset allocation choice, it is often the return from security selection that is sacrificed.

Consider the case of an investor who has both large-cap and small-cap equity managers. On the one hand, to the extent that small-cap stocks are less efficiently priced than their large-cap counterparts, the potential of the small-cap manager to add value relative to an underlying small-cap universe may be greater than the potential of the large-cap manager to add value relative to an underlying large-cap universe. The investor may thus want to allocate more to the small-cap than the large-cap manager.

On the other hand, small-cap stocks may be considered too risky in general, or may be expected to underperform larger-cap stocks. In the interest of optimizing overall fund return and risk, the investor may wish to limit the allocation to the small-cap manager and allocate significantly more to the large-cap manager. In that case, however, the investor sacrifices the potential alpha from small-cap security selection in exchange for overall asset class return and risk. The investor's asset allocation decision comes down to a choice between sacrificing security selection return in favor of asset class performance and sacrificing asset class performance in favor of security selection return.

With alpha transport, investors need no longer face such Solomonic decisions. Market neutral portfolio construction techniques and derivatives can be used to liberate managers, and manager performance, from their underlying asset classes. Investors, or managers, can deploy derivatives to transport the skill of any manager to any asset class. Alpha transport enables the overall fund to add value from both asset and manager allocation.

An Equity-Based Example

The equity example in Exhibit 8.3 can be slightly modified to illustrate more clearly the very real flexibility advantages afforded by market neutral construction in conjunction with the use of derivatives to achieve exposure to a desired asset class. Suppose this exhibit represents a market neutral investment in small-cap stocks. The 6% long-short spread thus represents the manager's skill in selecting small-cap stocks. It reflects neither the return nor the risk of small-cap stocks in general.

The manager can equitize this performance by purchasing futures on the S&P 500, as described above.[8] The manager can thus offer the performance of the large-cap equity index, enhanced by the value-added provided by her ability to select small-cap stocks. As long as this ability leads to a positive long-short spread (as it does in Exhibit 8.3), it will increase the return available from large-cap stocks when the index rises and reduce the loss when large-cap stocks fall.

Now consider the advantages for an investor such as the one described at the outset of this section. This investor may be faced with having to choose between the incremental returns expected from small-cap stocks and the lower risk afforded by a portfolio allocation to large-cap stocks. By choosing a market neutral small-cap portfolio equitized with large-cap futures, this investor can have his cake and eat it too. He can retain the allocation to large-cap stocks while reaping the returns available from small-cap selection. The investor incurs no exposure to small-cap stocks per se, only to the selection skills of the small-cap manager.

Alternatively, the investor can select a market neutral small-cap manager and establish a large-cap exposure by buying S&P 500 futures himself, or by engaging another manager to implement derivatives overlays. Nor is the investor limited to small- or large-cap stocks, or even to equity, for that matter. The investor can benefit from the skills of any market neutral manager, whatever the manager's area of expertise, and establish a desired exposure to virtually any asset class by using the appropriate derivatives. The active return from a market neutral strategy that exploits convertible bonds, mortgage-backed securities, merger situations, or sovereign fixed-income instruments can be transported via derivatives to allow the investor to maximize the benefits from both security selection and asset allocation.

ALPHA TRANSPORT ABSENT MARKET NEUTRAL PORTFOLIOS

It should be acknowledged that investors can take advantage of the asset allocation freedom provided by derivatives without necessarily having to engage in market neutral investing. To extend the example given above, suppose an active, long-only small-cap manager has been able to add value relative to the Russell 2000 small-cap universe, but that small-cap stocks are expected to underperform large-cap stocks. If an investor maintains an allocation to this small-cap manager, he will be giving up the incremental return large-cap stocks are expected to offer relative to small-cap stocks. But if the investor shifts funds from the small-cap to a large-cap manager in order to capture the expected incremental asset class return, he will be giving up the superior alpha from the small-cap manager's ability to select securities within the small-cap universe.

The investor, or the small-cap manager, can use derivatives to neutralize the portfolio's exposure to small-cap stocks in general and then transport any excess return (and residual risk) from the small-cap portfolio to the large-cap universe. The incremental returns from both security selection and asset allocation are retained.

In order to neutralize the portfolio's exposure to the small-cap universe, the investor or the manager can sell short futures contracts on the Russell 2000 small-cap index, in an amount approximately equal to the portfolio's value. Changes in the value of the futures contracts will offset the changes in the value of the portfolio in response to movements in the small-cap universe underlying the futures. The short derivatives position thus removes the fund's exposure to the small-cap universe. What remains is the differential between the portfolio's return (and risk) and the small-cap universe return (and risk) represented by the index. This excess return, or alpha, and its associated residual risk, reflect the manager's stock selection efforts.

Simultaneously, the investor or manager takes a long position in futures contracts on the S&P 500. This long derivatives position provides exposure to the desired asset class, the large-cap equity universe. The investor can thus benefit from any positive performance of the large-cap asset class while retaining the small-cap manager's performance in excess of the small-cap universe. The combined derivatives positions, one short and one long, effectively allow the investor to transport alpha from the underlying small-cap portfolio to the large-cap asset class, just as the alpha from the market neutral portfolio was transported via derivatives.

As an alternative to the two futures trades, the investor can look to the over-the-counter derivatives market, contracting with a swaps dealer to exchange small-cap equity returns for large-cap equity returns. The swap contract might specify, for example, that the investor pay quarterly over the term of the contract an amount equal to the return on the Russell 2000 index times an underlying notional amount—say the value of the underlying small-cap portfolio. The swaps dealer pays in exchange an amount equal to the return on the S&P 500 times the value of the portfolio.

Consider, for example, a $10 million fund fully invested in an active small-cap portfolio. Assume the Russell 2000 returns 10% over the period, the S&P 500 returns 13%, and the small-cap portfolio returns 12%. The small-cap portfolio grows from $10 million to $11.2 million. The fund pays out 10% of $10 million, or $1 million, to the swaps dealer. The fund receives 13% of $10 million, or $1.3 million, from the dealer. The fund winds up with $11.5 million for the period. It benefits both from the superior return on the large-cap asset class in excess of the small-cap asset class return and from the superior return of the active small-cap manager in excess of the small-cap asset class benchmark.

An active equity portfolio's value-added can even be transported to a bond universe with the use of futures or swaps. Futures contracts on an appropriate equity index can be sold short to neutralize the portfolio's equity exposure, while bond futures are simultaneously purchased to establish the desired bond exposure. Alternatively, the investor could enter into a swap to pay an equity index return times a notional value approximating the value of the underlying equity portfolio and receive an amount equal to a bond return times the portfolio value.

Alpha transport can thus enable investors to capture incremental returns from active security selection, whether in the form of long-only or market neutral portfolios, while maintaining the performance available from a desired asset allocation. But alpha transport with long-only construction cannot benefit from the potentially considerable return-enhancing and risk-reducing advantages of market neutral portfolio construction. While alpha transport affords flexibility in pursuit of return and control of risk at the overall fund level, market neutral portfolio construction affords flexibility in pursuit of return and control of risk at the individual portfolio level. By improving the manager's ability to implement insights, market neutral construction can lead to better performance vis-à-vis long-only construction based on the same set of insights.

COSTS AND BENEFITS

An investor considering alpha transport should recognize some of the problems that can arise. An alpha transport strategy that involves a market neutral portfolio, for example, may be subject to the shorting-related and leverage-related incremental risks and costs described in Chapter 3. In addition, alpha transport strategies involving either market neutral or long-only portfolios may incur incremental risks or costs related to unexpected mismatches between the derivatives used for transport and the asset class exposure desired.

For example, alpha transport may be limited by the unavailability or illiquidity of derivatives instruments. In particular, futures contracts are not traded on all asset class benchmarks that may be of interest to investors, and even when available the contracts may not have enough liquidity to support institutional-size needs. While futures contracts on the S&P 500 and U.S. Treasury bond futures enjoy excellent liquidity, liquidity may drop off considerably for contracts on other indexes. When investors face insurmountable interference in transporting via futures, however, they can turn to the OTC swaps market. Swaps can be customized to meet most investor needs.

Furthermore, although the price of a futures contract will converge to the price of the underlying instrument at expiration, futures-based strategies may not always provide the exact performance of the underlying index, for several reasons. First, although futures are theoretically priced to reflect the current value of the underlying spot index adjusted for the forward interest rate over the time to contract expiration and the value of dividends or interest on the underlying index, actual futures prices can diverge from theoretical fair prices. The most liquid futures contracts usually track their underlying indexes closely, but less liquid contracts tend to experience greater tracking error. This type of basis risk can add to or subtract from derivatives performance relative to the underlying index.

Futures performance may also differ from underlying index performance because of frictions introduced by margin costs and by the need to roll over more liquid short-term futures contracts. Because the purchase or short sale of futures contracts involves a deposit of initial margin (generally about 5% of the value of the underlying stocks) plus daily marks to market, a small portion of investment funds will have to be retained in cash. This will earn interest at the short-term rate, but will represent a drag on performance when the rate earned is below the interest rate implicit in the futures contract. In addition, the short rebate received on the proceeds of the short sales will generally be less than the rate implicit in futures contracts. Overall, the interest rate shortfall may amount to as much as 1% annually.[9]

Swaps reduce some of the risks of missing the target index. Swaps generally require no initial margin or deposit (although one may be required by the terms of a specific swap contract) and the term of the swap contract can be specified to match the investor's horizon. Furthermore, swap counterparties are obligated to exchange payments based on the terms in the contract; payments are not subject to fluctuations about the value of the underlying benchmark, as is the case with futures.

Swaps do entail price risk. A swaps dealer will generally extract a charge in the form of a spread. For example, an investor who wants to exchange the Russell 2000 return for the S&P 500 return may be required to pay the Russell 2000 plus some basis points. In general, the price of a swap will depend upon the ease with which the swap dealer can hedge it. If a swap dealer knows it can lay off a swap immediately with a counterparty demanding the other side, it will charge less than if it knows it will have to incur the risks associated with hedging its exposure. Swap prices may vary depending upon a specific dealer's knowledge of potential counterparties, as well as its ability to exploit tax advantages and access to particular markets.

Swaps also entail credit risk. Swaps are not backed, as are futures contracts, by exchange clearinghouses. The absence of initial margin deposit and daily marking to market further increases credit risk. Although credit risk will generally be minimal for the investor or manager swapping with a large investment bank (or the well-capitalized subsidiary of such a bank), the credit quality of counterparties must be closely monitored to minimize exposure to potential default.[10] Default may prove costly, and as swaps are essentially illiquid, it may be difficult or impossible to find a replacement for a defaulting counterparty.

The potential benefits of alpha transport, in terms of flexibility and value-added, are nevertheless substantial for both investors and managers. The decision to maximize alpha need no longer be subservient to the investor's asset allocation decision. The investor can pursue the best opportunities in both asset allocation and security selection.

Alpha transport may also liberate portfolio managers. This will certainly be the case if managers have neglected their own areas of expertise in order to pursue returns from those types of securities favored by clients. Alpha transport frees managers to focus on the universes within which they feel they have the greatest skill, hence the greatest potential to add value. This freedom should ultimately translate into enhanced performance for their clients.

Finally, managers and investors unfamiliar with market neutral investing and unaccustomed to derivatives may view the whole idea as just too complicated. In fact, however, alpha transport affords investors increased ease and flexibility in structuring an overall fund. By decoupling the security selection decision from the asset allocation decision, it allows these key elements of portfolio performance to be recombined to suit any investor needs.

NOTES

[1] Alpha transport is becoming increasingly popular among investors and managers. See Bruce I. Jacobs and Kenneth N. Levy, "Alpha Transport with Derivatives," *Journal of Portfolio Management*, May 1999; and James Rutter, "How to Make Volatility Pay—The Next Step Forward Could Be Portable Alpha," *Global Investor*, June 2003.

[2] In practice, lenders of stock will usually demand that initial collateral equal something over 100% of the value of the securities lent (even up to 105%).

[3] Reg T does not cover U.S. Treasury or municipal bonds or bond funds. Furthermore, Reg T can be circumvented by various means. Hedge funds, for example, often set up offshore accounts, which are not subject to Reg T. Broker-dealers are subject to much less stringent requirements than Reg T, and hedge funds and other investors may organize as their own broker-dealer or arrange to trade as the proprietary account of a broker-dealer in order to attain much more leverage than Reg T would allow. See Bruce I. Jacobs, Kenneth N. Levy, and Harry M. Markowitz, "Portfolio Optimization with Factors, Scenarios and Realistic Short Positions," forthcoming, *Operations Research*.

[4] See Bruce I. Jacobs and Kenneth N. Levy, *Equity Management: Quantitative Analysis for Stock Selection* (New York: McGraw-Hill, 2000).

[5] Bruce I. Jacobs, Kenneth N. Levy, and David Starer, "Long-Short Portfolio Management: An Integrated Approach," *Journal of Portfolio Management*, Summer 1999.

[6] Gary P. Brinson, Brian D. Singer, and Gilbert L. Beebower, "Determinants of Portfolio Performance II: An Update," *Financial Analysts Journal*, May/June 1991.

[7] William F. Sharpe, "Asset Allocation: Management Style and Performance Measurement," *Journal of Portfolio Management*, Winter 1992.

[8] One might think Exchange Traded Funds (ETFs) would provide an alternative to futures, as they also offer exposure to various market index benchmarks. However, they are subject to Reg T margin requirements, hence establishing a given position in ETFs requires substantially more funds (some 10 times more) than establishing a comparable position in futures.

[9] The investor may have some room for negotiation in the investment of the short sale proceeds. Typically, overnight rates are pegged to Fed funds, LIBOR, or broker call, but the funds may be committed for longer terms at higher rates. Investment for longer terms will subject the proceeds to interest rate risk if the performance benchmark is linked to a floating rate, but it may reduce risk for an equitized market neutral portfolio (for instance, if the maturity of the investment matches that of the stock index futures contracts used as an overlay on the portfolio).

[10] And, as recent examples such as Enron and WorldCom show, relying on credit rating agencies is not necessarily sufficient.

CHAPTER 9

A Tale of Two Hedge Funds

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

Two spectacular blowups in the 1990s marred the reputation of market neutral investing. The failure of Askin Capital Management in 1994 and the collapse of Long-Term Capital Management in 1998 cost their investors hundreds of millions of dollars, roiled the financial markets, and led many to question the legitimacy of market neutral strategies. We discuss each case below—what happened, the extent to which blame can be laid at the feet of market neutral investing as a strategy, and the lessons to be learned.

ASKIN CAPITAL MANAGEMENT

In April 1994, Askin Capital Management (ACM) filed for bankruptcy. David Askin had assumed control of two hedge funds, Granite Partners (a limited partnership) and Granite Corporation (a Cayman Islands corporation), in January 1993. He had managed the funds for their previous owner since September 1991. Prior to that, Askin had worked in fixed income at Drexel Burnham Lambert and Daiwa Securities, where he had established a reputation for quantitative management and for evaluating mortgage prepayments.

According to the report of the trustee assigned to oversee the ACM bankruptcy, ACM was perhaps the only firm that used a leveraged market neutral strategy based on investments in collateralized mortgage obligations (CMOs). The objective of the Granite funds, as stated in the marketing materials, was to achieve interest and capital appreciation equal to 15% per year, "regardless of whether the bond market moves up, down or stays the same."[1] Also, according to marketing materials, the Granite portfolios were hedged against broad bond market movements by "taking long positions in both undervalued bullish securities and long positions in undervalued bearish securities." In other words, the funds were meant to be market neutral, with market neutrality achieved via long-long, rather than long-short, portfolio construction.

A market neutral strategy based solely or primarily on long positions is conceivable in the context of mortgage-backed securities because of the variety of instruments available and the range of their responses to interest rate movements. When interest rates decline, for example, returns to principal-only securities (POs) may be expected to rise. This is because POs entitle their holders to the principal portion of mortgages, and when interest rates decline, homeowners tend to refinance, allowing PO holders to receive principal payments sooner than expected. In the same environment, however, the value of interest-only securities (IOs) may decline, as prepayments truncate the cash flows to IOs. Whether a long-long strategy is feasible in practice, however, is another question.

ACM's market neutral portfolios relied almost exclusively on CMO securities, many of which were purchased via repo (repurchase) agreements. That is, ACM purchased the securities and then "sold" them back to the broker-dealers it had bought them from on the understanding that it would repurchase the securities at a later date. In effect, the proceeds from the resale to the broker-dealers served as a loan to ACM, for which ACM paid with interest of 3% to 4% and a 5% to 25% haircut (depending on the riskiness of the security being repoed). The securities "bought" by the broker-dealers served as collateral for the loans. ACM targeted and maintained modest leverage levels, with total debt equaling between 1.0 and 3.5 times equity.

The instruments purchased by ACM were largely esoteric ones, with names like "super PO," "Z bond," "inverse floating rate IO," and "two-tier PAC IO." Many of the media reports following the ACM bankruptcy described the firm's holdings as "toxic waste"—a term the Street applies to what's left over after the dealers finish slicing and dicing. That is, dealers purchase pools of mortgages from the federal mortgage agencies and create from them securities with yield and risk attributes attractive to potential institutional and retail investors. The sale of these securities, however, is often dependent upon the ability of the dealers to get rid of the less attractive attributes of the mortgages; dealers accomplish this by packaging the less attractive attributes, such as complexity and high risk, into instruments they can sell to investors such as ACM.

In fact, so important are customers such as ACM to the profitability of dealers' mortgage bond businesses that the dealers often make special accommodations for them. Kidder Peabody, for example, had set up a Special Account Facility Pool to accommodate the financing needs of corporate customers that did not have high enough credit ratings to obtain financing from the firm's regular credit department. ACM was the pool's biggest client.

Dealers also make "toxic waste" products palatable by structuring them to offer a high expected yield. Whether purchasers will benefit from these high expected yields, however, is heavily dependent on their ability to assess the securities' real risk-adjusted value. Because the instruments are so complex and are generally very thinly traded, they are very difficult to value. They may have option-like payoffs, for example, offering big profits in some interest rate/prepayment rate environments, but large losses in slightly different environments.

ACM claimed to have proprietary analytical models, including a model that assessed the probability and effects of prepayments, to evaluate the attractiveness and relative riskiness of the instruments. It also claimed that it used advanced hedging techniques to construct portfolios. In reality, ACM's pricing of portfolio assets was heavily dependent on value estimates (or "marks") solicited from broker-dealers. Furthermore, when Askin did not agree with a particular dealer's mark, he had the options of (1) discussing it with the dealer in hopes of getting a better mark; (2) soliciting a mark from another dealer, then averaging the two marks; or (3) using his own assessment of value (a "manager mark"). Resort to the last option was rare—before March 1994.

Marking Time

In fiscal 1992, the first full year under Askin management, the Granite funds had generated a gross return of 17% to 18% on equity of about $200 million. For 1993, the first year under Askin's ownership, the funds achieved a combined return of about 20%. Following these successes, Askin established a new fund, Quartz Hedge Fund, which was designed to provide a target return of 25% from a strategy of exploiting interest rate changes; that is, this fund, rather than being market neutral like the Granite funds, was designed to be market directional. By February 1994, ACM managed funds with a value of about $450 million (about $60 million of which represented investments in Quartz) and managed as well five segregated accounts with assets of $10 million to $25 million each.

The interest rate environment had so far remained benign, with rates stable or declining. But in February 1994, the Fed instituted the first in a series of six rate hikes for the year. For ACM, the results were catastrophic. In February alone, ACM's portfolios' net asset value declined by about 20%, according to broker–dealer marks. Askin, however, decided to use his own manager marks to value the portfolios. As a result, the firm's report to investors, released in early March, showed a decline of 1% to 2% for the month. The portfolios' values continued to deteriorate, however, especially after another quarter-point hike by the Fed hit bond markets on March 22. On March 25, Askin faxed to investors revised February figures showing a 20% drop for the month. The fax invited investors to meet at ACM offices the following Monday, March 28.

ACM's investors were shocked. So, surprisingly, were the firm's broker–dealer counterparties. They had apparently experienced their own problems assessing the value of the collateral placed with them by ACM, and had badly underestimated their exposures to the firm. The trustee's report finds that many of the broker–dealers had failed to evaluate their positions with ACM on a timely enough basis to ensure adequate collateral in the rapidly changing environment of early 1994. Some had tightened margin requirements at regularly scheduled repo rollovers in February and early March, but only a few, including Bear Stearns and Donaldson, Lufkin & Jenrette (DLJ), had issued any significant interim margin calls. Most had failed to keep track of exposures due to forward sales of CMOs to ACM. As a result, when ACM's troubles became public in late March 1994, brokers engulfed the firm with a tidal wave of collateral demands.

Margin calls of over $30 million and $50 million from Bear Stearns and Kidder Peabody, respectively, hit ACM on Monday, March 28. ACM had difficulty meeting these calls. Its cash reserve (which had been maintained at about 5% of assets) was inadequate. Nor could it readily liquidate assets. Most of its assets were already held by broker–dealers as collateral on repo agreements. In any event, ACM would have found it extremely difficult to locate buyers for these illiquid, complex securities, given the generally poor condition of the bond market.

Askin, meeting with investors on Monday, March 28, urged them to kick in capital to keep the funds going. He met with little success. The investors, in fact, were already looking for a third party able to evaluate the Askin portfolios and willing to buy them out. By the end of the day, ACM had scrounged up about $10 million in cash and $18 million in collateral for Bear Stearns. No funds were sent to Kidder Peabody. ACM questioned the propriety of Kidder's margin call, as it was based totally on forward contracts that were not scheduled to settle until the end of the month.

On Tuesday, March 29, Kidder descended on ACM's offices to go over the books. Kidder officials apparently broached with Askin the possibility of a Kidder buy-out, but backed out when they realized Kidder would not be able to obtain the bonds held on repo with other brokers. Bear Stearns was demanding an additional $10 million, and threatening to liquidate its collateral the next morning, even as Askin was trying to convince Bear Stearns to buy the portfolios, or at least its interests in them.

Early on Wednesday, March 30, ACM was hit by margin calls from Merrill Lynch, DLJ, Kidder, Greenwich Capital, and Morgan Stanley. Trust Company of the West (TCW), which had been brought in by ACM investors to discuss the possibility of assuming the funds' management, was having difficulty evaluating either the full amount it would take to bail out the funds or the potential remaining asset value. Meanwhile, Bear Stearns proposed buying out its portions of the Granite portfolios, making clear that it would start liquidating if refused. The offer, extended at some time between 3:30 and 3:45 that afternoon, was rejected by 4:30; Bear Stearns started liquidating ACM assets at 5:00.[2] This opened the floodgates. ACM filed for bankruptcy on April 4, and its investors lost an estimated $600 million.

A Question of Neutrality

Did the failure of ACM represent the failure of a market neutral strategy? Strictly speaking, no. The trustee's report finds that "the Granite Fund portfolios were not managed in a manner consistent with the stated investment policy of 'market neutrality'" and that "the quantitative tools utilized by ACM to test market neutrality were inadequate for that task."[3]

While ACM's marketing material had claimed that "proprietary" tools were used to evaluate securities and manage the portfolios, ACM had actually relied on commercial programs, information from broker-dealers, and a hefty dose of human judgment.[4] To value securities, for example, ACM used online data services such as Bloomberg Financial Services. In late January 1994, it added software that could have produced effective duration and option-adjusted spread (OAS) analyses, but ACM apparently did not exploit these features. ACM did use a proprietary model developed by an outside consultant to project and aggregate individual security cash flows; this model could not compute effective duration or perform OAS analyses, yet was the firm's primary tool for computing portfolio neutrality.

The trustee's investigation could find no evidence of a proprietary prepayment model, nor could any of Askin's employees verify the existence of such a model.[5] Also lacking was any form of quantitative stress testing. Rather, stress testing seems to have consisted of Askin's subjective evaluation of how securities would perform, given prepayment or interest rates within the range of the assumptions underlying broker–dealer price quotes.

It is thus hardly surprising that the funds' managers had but a tenuous grip (if that) on portfolio neutrality. In the fall of 1993, for example, ACM purchased inverse IOs. According to Richard John, a portfolio manager at ACM, Askin considered these securities to be fundamentally bearish because they were interest-only instruments. John himself believed that the bonds were at least partly bullish, because of the potential effect of an increase in short-term rates on the bonds' coupons.[6] However, with the purchase of these bonds and the sale of bullish POs out of the portfolios, Askin (again, according to John) thought that the portfolios were becoming too bearish and increased purchases of POs and inverse floaters.[7] As of the end of 1993, over 80% of the Granite funds was invested in these obviously bullish securities or equally bullish inverse IOs.[8]

Going into 1994, according to minutes of the investment committee and Askin's discussions with employees and broker-dealers, Askin was looking to purchase more bearish securities. By this time, however, the market was already reflecting the expectation of rising interest rates. ACM found it difficult either to sell off its bullish securities or to buy more bearish securities at reasonable prices. Nevertheless, the funds continued to purchase more inverse IOs. Askin apparently continued to believe these securities were bearish (and some were represented as such by the selling brokers). The funds also, however, purchased new inverse floaters and Super POs, which were clearly bullish.

Both Askin and John apparently believed that the Granite funds had a duration of about one (with zero duration being truly market neutral) in mid-February.[9] This is hardly likely, however, because over 90% of the portfolios was invested in bullish securities by the end of February. The expert hired by the bankruptcy trustee found that the portfolios' effective durations were in excess of 10 (in fact, close to 15 for the Granite Corporation and close to 11 for Granite Partners) at that time, and were at about the same levels when ACM declared bankruptcy.[10] At these levels, ACM's supposedly market neutral portfolios had effective durations of about three times the magnitude of the U.S. Treasury market. The trustee's report concludes:

> Whether knowingly, recklessly or negligently on ACM's part, the Granite Fund portfolios were badly out of "tilt,"

> and were, in fact, market directional, not market neutral, at the time of their collapse. The lack of neutrality, moreover, was a direct and proximate cause of that collapse.[11]

What Didn't Go Wrong?

ACM appears to have been adequately diversified in terms of its relationships with broker-dealers. Beyond this, it appears that everything ACM management could have done wrong, it did wrong, and everything that could have gone wrong, went wrong.

Transparency. Prices for most of the securities in which ACM invested were not readily available from an objective source, such as a public auction. Instead, ACM and its counterparties were forced to rely on their own valuation models, which, in the case of ACM at least, proved inadequate, for reasons discussed below. This opened the door to a host of problems, Askin's misleading February financial statement being only the most blatant.

Complexity. The instruments ACM invested in were difficult to value, with the potential to exhibit nonlinear reactions to changes in interest rates and prepayment levels. This made it difficult for ACM to determine securities' possible reactions to interest rate changes, hence to construct market neutral portfolios. In addition, ACM's repo and forward counterparties experienced their own problems evaluating these securities on a timely basis. As a result, losses at ACM in early 1994 accumulated to a degree that jeopardized the firm's ability to meet the flood of margin calls that came in late March.

An argument might also be made that complexity and lack of transparency contributed to Bear Stearns' March 29 margin call, later found by the bankruptcy trustee to have been improper, which precipitated the liquidation process. With greater transparency (or less complexity), it is also possible that Kidder Peabody, TCW, or another "white knight" might have succeeded in putting together a deal that would have avoided liquidation.

Investment models and processes. ACM obviously lacked the tools needed to value its complex instruments properly. At several points, in fact, Askin and his coportfolio manager, John, appear to have been in fundamental disagreement over such basic issues as whether a given security's value would rise or fall with a rate increase. ACM illustrates the shortcomings of an investment approach that relies primarily on judgment calls when the instruments employed demand quantitative tools.

Given the inadequacies of ACM's valuation process, it is hardly surprising that its portfolios ended up poorly diversified and far from market neutral. But the failure to achieve market neutrality may reflect, beyond valuation problems, a fundamental flaw in ACM's strategy itself. ACM stated that the Granite funds were designed to attain neutrality through a long-long portfolio structure—an objective that, as we have noted, is theoretically attainable because of the nature of CMOs. The expert hired by the trustee to evaluate the firm's portfolios, however, calls into question the validity of long-long as a market neutral approach: "Although Askin's 'long-long' strategy could be effective over a very narrow band of interest rate movements, ... such a strategy could not hold up over larger movements in interest rates."[12] Thus ACM's market neutral funds may have been doomed to failure, even if its valuation process had been able to pass muster.

Liquidity. ACM faced liquidity problems on several levels. In early 1994, ACM ran up against market illiquidity. With expectations of higher interest rates pressuring the prices of the narrowly traded instruments ACM specialized in, the firm found it difficult to maintain even its idea of market neutrality; it had difficulty both selling off the bullish securities in its portfolios and purchasing desired bearish securities. At the end of March, the illiquidity of the firm's positions, combined with its leverage, proved fatal. The firm could not liquidate portfolio assets that were already being held by the dealers demanding additional collateral. Furthermore, given the small market for the firm's securities, and the lack of transparent pricing, ACM found itself at the mercy of these dealers, not only as lenders, but also as the ultimate arbiters of the value of the firm's assets.

Leverage. The ACM story demonstrates that even relatively modest levels of leverage can spell disaster when the borrower cannot come up with payments demanded by lenders. ACM's failure to rise to the occasion can be blamed on several factors—the firm's inadequate cash reserve, the innate illiquidity of its assets, and the structure of its financing deals (which placed its assets in the hands of lenders). Ultimately, however, it reflects the failure of the firm to value and manage its assets properly.

LONG-TERM CAPITAL MANAGEMENT

The same year that saw the death of ACM saw the birth of a new star in the market neutral hedge fund firmament. Long-Term Capital Management (LTCM) was headed by John W. Meriwether, who had gained fame and fortune by creating Salomon Brothers' bond arbitrage operation in the 1980s. Several of his former employees at Salomon had jumped ship to join LTCM. Meriwether also brought on board a former vice chairman of the Federal Reserve Board, as well as Robert C. Merton and

Myron S. Scholes, who were soon to win the Nobel Prize for their work on valuing options. Their option pricing theories, based on arbitrage relationships between options and their underlying stocks or bonds, had spawned the whole new world in which ACM and LTCM operated.

By mid-1994, Meriwether had raised over a billion dollars in equity, on top of the $100 to $150 million anted up by the firm's general partners. LTCM's investors—institutions and a small number of wealthy individuals—were required to keep funds invested for a three-year lock-up period and to pay an annual management fee of 2% in return for 75% of the firm's investment profits.

LTCM ran a host of market neutral strategies from its headquarters in Greenwich, Connecticut and offices in London and Tokyo. Its core strategies were designed to exploit various perceived inefficiencies in interest rate and equity markets. The firm specialized in "convergence trades," holding offsetting positions that were scheduled to converge in price at a given future date, and "relative value arbitrage," where convergence was expected but not certain.[13]

LTCM looked for opportunities created by regulatory or structural frictions that caused prices to diverge from historical norms or perceived values. Japanese banks, for example, were required to receive fixed and pay floating in yen-denominated swaps. LTCM held long positions in Japanese government bonds and bond futures and hedged with yen-denominated swaps in which it paid fixed and received floating.

In Italy, high levels of government debt made for high fixed rates on government bonds in the mid-1990s. Yet floating rates on Italian swaps were declining in anticipation of the convergence of European currencies at the initiation of the Euro. LTCM purchased Italian bonds on repo, receiving the fixed coupons from their repo counterparties and paying floating; simultaneously, it entered into lira interest rate swaps, paying the fixed swap rates and receiving floating.

In the United Kingdom, lack of demand for government bonds caused short-term rates to rise, which in turn led U.K. mortgage lenders to pay fixed on interest rate swaps. LTCM borrowed 10-year U.K. government bonds using reverse repos, and entered into 10-year interest rate swaps to pay floating and receive fixed; at the same time, it purchased 10-year German government bonds on repo and entered into 10-year interest rate swaps to pay fixed and receive floating.

In the equity arena, European retail investors had been snapping up products that offered a guaranteed minimum return plus the opportunity to participate in equity market appreciation. Issuers of these products often used options on equity indexes in order to supply the upside. Their demand for such options helped to raise option-implied volatility to historically high levels through the mid-1990s.

In addition, in mid-1997, troubles in Asian economies prompted a worldwide increase in equity market volatility. This was reflected in the United States by the stock market minicrash of October 27, 1997. Implied volatilities shot up in the United States and Europe. LTCM attempted to exploit what it perceived as a temporary mispricing through a number of complex trades. For instance, it bought short-dated, at-the-money forward straddles on the French CAC and shorted long-dated, at-the-money forward straddles, hedging the interest rate risk with futures and the market risk with index futures.

LTCM also became a substantial player in merger arbitrage. By 1997, it had about $5 billion in long (and corresponding short) positions in securities involved in merger situations. Other strategies pursued by LTCM included convertible arbitrage, including long positions in what LTCM deemed to be underpriced Japanese convertibles, hedged with interest rate swaps, shorted equities, and options; equity long-short pairs trades; and yield curve relative value trades in the United Kingdom, France, Germany, and Japan.

As befits a firm that employed two Nobel laureates in economics, LTCM relied heavily on analytical models. Its complicated "risk aggregator," for example, analyzed all the firm's positions on a global basis, taking into account position variances, covariances between positions, and estimated potential losses from extreme events. Nevertheless, the firm's overall investment approach, its partners maintained, was not reliant on any "black box," but based on sound market and economic fundamentals.[14]

LTCM's portfolio was structured to be market neutral with respect to interest rates, stock market risk, and currency risk; the overall fund was said to have "triple net zero" exposure.[15] With these major sources of risk supposedly neutralized, the risk level of LTCM's portfolio was deemed to be very low. LTCM had informed its investors early on (in October 1994) that the probability of a loss of 20% or more of portfolio value was only one in 100.

Of course, expected return was also low, on a per trade basis. LTCM aimed to provide high returns, while maintaining a very low risk profile, by leveraging its low-risk positions to the point that overall return volatility approximated the level of an unleveraged position in the U.S. equity market. Banks and dealers were eager to comply. Impressed with the reputations of the firm's partners, and later by the firm's stunning profits, lenders were willing to provide financing at extremely favorable terms, including below-market interest rates and no haircuts on repo arrangements.

Through much of the firm's history, leverage averaged about 25-to-1 (not including derivatives positions). With this amount of borrowing on top of its capital base, the firm was able to take massive positions. In fact, in terms of both the amount of leverage employed and its position sizes, LTCM operated more along the lines of a Wall Street trading desk than a mere hedge fund.

LTCM apparently believed that leverage would not become a problem. Its leveraged positions were fully collateralized and subject to two-way marking to market. In addition, the firm undertook value-at-risk (VAR) analyses, stress tests, and scenario analyses to ensure capital adequacy.

LTCM undoubtedly believed that safety was ultimately provided by the wide diversification of its investments. Not only did LTCM invest around the globe, in bond markets and equity markets, it had also diversified across investment horizons, from short to long term, and across investment strategies. In September 1997, for example, LTCM was employing about 100 strategies and had 7,600 positions and 6,700 separate contractual arrangements with 55 counterparties.

The Force is With Them

When LTCM launched in 1994, it was entering a bond market in turmoil. The Fed had raised rates a quarter point in early February and another quarter point in late March. Between January 28 and April 14, 30-year U.S. government bonds fell 14%. Elsewhere, political instability was roiling Mexico, the yen was surging against the dollar, and bond prices were falling across Europe.

These developments not only doomed ACM, but were plaguing bond investors in general, including Goldman Sachs, Fidelity Investments, Bankers Trust, the Soros Fund, and the hedge funds of Julian Robertson and Michael Steinhardt. Many of these investors were unloading their more liquid positions in order to raise the capital to meet margin calls. For LTCM, of course, liquidity was not a problem. Flush with their $1 billion plus in new investments, they were like kids in a candy shop, eager and able to pick up the bargains, including off-the-run Treasuries and interest-rate-only CMOs. LTCM ended up the year with a return of 28%, even as the average bond investor lost money.

LTCM's return in 1995 was a stunning 59% (before fees). The firm had by now more than doubled its initial investment. On the strength of this stellar performance, LTCM raised an additional $1 billion in capital. But despite the increased capital, the firm's leverage was also rising. By the spring of 1996, the firm was leveraged at about 30-to-1, with assets of $140 billion. It ended the year with a return of 57%.

In 1997, however, returns began to level off. The firm's leverage also dropped, at one point to below 20-to-1. The return for the year, at only 25%, was above the rate achieved by the broad equity market, but less than half of what LTCM had garnered in each of its previous two years.

At the end of 1997, the LTCM general partners decided to return $2.7 billion to investors.

Some have suggested that the give-back was motivated by the partners' realization that, given structural changes in the world economy (including the nearing launch of the euro), spreads were narrowing and profit opportunities declining. At LTCM's annual meeting in July, the partners expressed concern about the reduced potential for profits in bond arbitrage.[16] However, this realization did not induce LTCM to cut back on investing. With equity reduced to under $5 billion from about $7 billion, the firm maintained assets of about $125 billion. Leverage was back in the range of 25-to-1. Apparently LTCM still believed increased leverage could compensate for reduced profit margins.

A Year of Crisis

Late October 1997 seemed to represent the culmination of the crisis that had hit first with the devaluation of the Thai baht in July and then spread to weaken Asian currencies and markets generally. On October 27, heavy selling in Hong Kong spooked the U.S. equity market, which dropped about 7%. Markets around the world followed suit.

Increased equity market volatility pushed up demand for options. In Europe, implied volatility rose to 24%, well above the historical level of 15%. LTCM viewed this as a ripe profit opportunity. Through the end of 1997 and into 1998, it sold large amounts of long-dated option positions on U.S. and European equity indexes.

This seemed like a good bet at first, as equity markets recovered strongly after October 1997. Long-term government bond yields, especially in the United States, also continued to narrow, as did the spread between corporates and government bonds. From beneath this seemingly benign surface, however, problems began to emerge in early 1998.

In particular, investors in mortgage-backed securities suffered a sharp setback when lowered interest rates sparked an unexpectedly heavy rush of prepayments. Some covered their losses by selling off profitable positions in emerging market debt. These sales, however, seemed to awaken investors' perception of risk in emerging markets. Money was pulled out of these markets, driving prices down, and reinvested in developed countries' government securities, raising prices in those markets. As a result, interest rate swap spreads widened.

LTCM ended May down about 6.5% and June down another 10%. It was the first time in its history that the firm had experienced losses in two consecutive months. LTCM decided to respond by lowering its risk. The daily standard deviation of the firm's portfolio amounted to about $45 million, in line with the its objective of targeting the volatility of the broad equity market.[17] The partners decided to take this down to $34 million. They did so, however, by selling off some of the more liquid positions, retaining the trades that seemed to offer higher profitability over the longer term.

LTCM ended July flat. But the omens in that month were not good. On July 7, it was announced that Salomon's U.S. bond arbitrage group—the very breeding ground of LTCM—would close. Of course, Salomon was no longer Salomon Brothers. Since Meriwether's departure, it had been sold to Citicorp, which had in turn merged with the Travelers, and Salomon Brothers had become Salomon Smith Barney. The bond arbitrage desk was not a good fit in this new environment, and when it started losing money in early 1998, its fate was sealed.

The liquidation (actual and pending) of the Salomon arbitrage positions created real problems for LTCM and other funds and proprietary trading desks, which held similar positions. As July turned into August, swap spreads widened considerably. The prices of LTCM's long positions were now falling as the prices of its short positions were rising.

Then, on August 17, Russia dropped a bomb. It announced a de facto devaluation of the ruble and a 90-day moratorium on repayment of $40 billion in corporate and bank debt to foreign creditors. The impact of these announcements was compounded by several factors. First, although the safety of investments in Russia was never a sure thing, the timing of these announcements was completely unexpected; Russia had just raised $3.5 billion in new bonds less than a month before. Second, the safety nets that many investors had expected to protect them from the full impact of such an event failed to materialize. Many of the hedging arrangements, such as forwards, on which large investors in Russian debt had relied, fell through for various technical reasons.

The International Monetary Fund (IMF) did not ride to the rescue. Investors had watched the IMF bail out Mexico in 1994 and South Korea in 1997. They fully expected like protection in the event of a Russian collapse. But the IMF declined to step in this time.

The Russian default started a stampede to safety that trampled many markets. Funds were sucked out of Russia and other commodity-producing countries, including Canada, Mexico, Brazil, and Venezuela, as well as Japan and Hong Kong, and plunked down on short-term instruments in developed countries, particularly U.S. Treasury bills. Some banks, including Barclays in the United Kingdom, started unloading their losing swap trades, adding further pressure to spreads.

The flight to safety engulfed equity markets, with emerging market stocks going under first, and the developed markets by the end of the month. Equity market volatility exploded way above the historical averages on which LTCM had based its equity option trades. With each percentage point increase, LTCM was on the hook for tens of millions of dollars.

In the last week of August, with its trades imploding, LTCM scrambled for additional capital. It approached George Soros and Warren Buffett, as well as the investors it had cashed out in 1997. Buffett said he was not interested. Soros offered $500 million, on the condition that LTCM could raise another half billion.

But LTCM was already facing difficulties meeting the margin calls on its losing positions. Unable to raise additional capital, it was equally hamstrung by its inability to liquidate assets. It had sold off its more liquid positions following the losses in May and June. The trades it retained constituted the longer-term, more illiquid positions whose high spreads at that time had promised the most profit potential. But spreads had only gotten wider in the intervening months. LTCM was holding losers on both the long side and the short side. Those who might serve as the natural buyers of these trades—other hedge funds and proprietary trading desks—were hardly in a position to take more bets on; they were in the same (sinking) boat as LTCM.

Goldman Sachs and Chase Manhattan had suffered substantial losses in Russian bonds. The Travelers and its subsidiary, Salomon Smith Barney, were racking up losses as interest rate swap spreads in Europe widened. Stocks and high-yield bonds were being sold to cover losses on leveraged positions around the world. Heavy selling of stock index futures, motivating sales by index arbitrageurs in the underlying cash market, contributed to a 6.4% drop in the Dow on August 31.

For the month of August alone, LTCM lost $1.8 billion. Since the start of the year, it had lost about half its equity. Its leverage ratio was (involuntarily) up to 55-to-1. And there was no respite in sight.

Transparency (both too little and too much) was also beginning to pose problems. In order to keep its strategies proprietary, LTCM had split trades up across counterparties; the long side of a trade, for example, would be arranged with one broker, while LTCM held the short side with another broker. Each of LTCM's counterparties was thus left with exposure it had to hedge, as well as with an incomplete picture of the offsetting positions that reduced LTCM's overall risk.

LTCM tried to remedy this situation and assuage the fears of its counterparties by transferring positions to make the offsetting nature of its trades more transparent. Unfortunately, its attempts were hampered by the complexity of the trades, the size of the positions, and the large number of counterparties.

On the other side of the problem, LTCM's attempts to shuffle trades and raise capital made its positions more transparent to the firms it did business with, which were in essence competitors. From the end of

August and into September and October, Wall Street seemed to be front-running many of LTCM's trades, whether in an attempt to profit from LTCM's straitened circumstances or merely to get out from under the pending liquidation of LTCM assets. In either case, the result was to move prices further against LTCM.

Early in September, LTCM incurred losses of over $100 million on several days. Bear Stearns was threatening to cease clearing trades for the firm unless it deposited more capital. In last-ditch efforts, LTCM opened its books to Goldman Sachs, hoping for a capital infusion. Goldman, meanwhile, was talking to Warren Buffett about a possible buyout of the fund. On September 20, the Federal Reserve Bank of New York, in the person of Executive Vice President Peter Fisher, visited LTCM's Greenwich offices, together with officials from Goldman Sachs and J.P. Morgan, to assess the situation.

On September 21, LTCM lost over $500 million. Its equity was now below $1 billion, and its leverage was over 100-to-1. LTCM finally called on its line of credit, receiving enough at least to satisfy Bear Stearns.

According to New York Fed President William McDonough, the Fed determined that default by LTCM would have led LTCM's counterparties to immediately close out their positions.[18] A fire sale of billions of dollars of assets would have eventually led to losses extending beyond LTCM's counterparties and creating tremendous uncertainty. The end result would have been extreme price moves, disruption of credit and interest rate markets, and reverberating effects that could have raised the cost of capital to unreasonable levels.

The New York Fed thus encouraged the investment banks and brokers involved with LTCM to come up with a solution that did not require default. On September 23, senior officers of 16 banks and brokerage firms met at the Fed's headquarters in New York. At the end of the day (having rejected an interim offer from Buffett, allied with American International Group and Goldman Sachs), Meriwether and LTCM accepted the buyout offer that came from 14 of the institutions represented at the Fed's offices—$3.6 billion in exchange for 90% of LTCM's assets. This left the old investors with about $400 million, less than one-tenth of the value of their assets at the beginning of 1998. Effective control of the firm was turned over to a six-man oversight committee composed of managers put in place by Merrill Lynch, Salomon Smith Barney, J.P. Morgan, UBS, Morgan Stanley, and Goldman Sachs.

The oversight committee identified LTCM's biggest problems to be its U.K. swaps and its equity options. LTCM had huge positions in both strategies. The committee arranged for regular public auctions to unwind the positions gradually. It also continued to consolidate the offsetting sides of LTCM's trades by pairing up the counterparties and backing LTCM out of the trades. By December 1999, some 10,000 swaps on LTCM books at the time of the bailout had been reduced to 50. For the post-bailout year ending September 28, 1999, LTCM had a positive return of 10%.

In January 2000, the announcement was made that LTCM would close down, with a final payment of $925 million to the bailout consortium. Meriwether had already set up a new firm, JWM Partners, offering a new hedge fund, Relative Value Opportunity Fund. The stated objective of this fund: annual returns of 15% to 20% with leverage of 10-to-1.

What Could Have Gone Wrong?

In essence, LTCM viewed itself as a financial intermediary similar to a major investment bank or broker-dealer. Both Myron Scholes and David Modest, former LTCM partners, described LTCM as being in the business of supplying liquidity.[19] To compete with an investment bank in terms of either profits or business, however, required that LTCM use a comparable degree of leverage. In fact, LTCM's leverage was in line with that of a broker-dealer or investment bank and well above the leverage utilized by the vast majority of hedge funds.

Unlike banks or brokers, however, LTCM had a single line of business—arbitrage. Banks and brokers that engage in arbitrage do so as only one part of a more diversified palette of financial activities. Their arbitrage losses may be offset by gains in other areas, such as underwriting or brokerage. LTCM could rely only on the diversification of its arbitrage trades or, failing that, on its ability to raise capital either by liquidating assets or by attracting new investment. As we will see below, the diversification of LTCM's trades failed, it was unable to raise additional capital, and it was toppled by its own leverage.

Diversification. LTCM is often portrayed as the victim of extraordinary events. According to Michael Lewis, writing in the *New York Times Magazine*, "Suddenly there was no limit [to the market's unreason]. Alan Greenspan and [U.S. Treasury Secretary] Robert Rubin said they had never seen such a crisis, and neither had anyone else."[20] In his September 1998 letter to investors, Meriwether seemed to echo this plaint: "events surrounding the collapse in Russia caused large and dramatically increasing volatility in global markets through August."[21] This explanation begs the question of why LTCM was so susceptible to the unexpected events in August.

As noted in the introduction, an investor's primary defense against uncertainty is diversification. LTCM seemed to be more than adequately diversified. It had invested across strategies, countries, instruments, counterparties, and investment horizons. Yet all this diversification proved to be an illusion in the crucible of the Russian debt crisis and its aftermath, when trades that appeared to be uncorrelated on a fundamental level suddenly became highly correlated.

As noted, LTCM viewed itself as a liquidity supplier. It sought the premiums to be gained by supplying (i.e., shorting) in-demand long options and on-the-run Treasuries, while purchasing what it viewed as relatively cheaper, and less liquid, securities such as off-the-run Treasuries and lower-quality, higher-yielding bonds. In the panic of the moment, however, investors ran away from illiquidity and embraced liquidity, across the board. Irrespective of market or instrument, LTCM's long positions fell as the prices of its short positions rose. As Meriwether admitted in his September letter to investors, "our losses across strategies were correlated after the fact."

Model risk. It seems clear that, to the extent LTCM's actions in the middle six months of 1998 were directed by its models, these models proved wanting.[22] The models seem to have been based on correlation estimates drawn from historical experience and on assumptions drawn from an overly rational view of market behavior.

Robert Haghani, one of LTCM's chief traders, stated, in the aftermath of the bailout, that, "What we did is rely on experience . . . if you're not willing to draw any conclusions from experience, you might as well sit on your hands and do nothing."[23] This seems reasonable, until one asks about the scope of the experience LTCM was relying on. While the sea change in the summer and fall of 1998 was unusual by historical standards, it was certainly not unprecedented. Crises in 1997, 1992 and, most notably, 1987 had resulted in similar bouts of investor panic, contagion across markets, and dramatic and sudden tightening of correlations between fundamentally unrelated markets.[24] Incorporation of this history into LTCM's correlation estimates, or into its stress testing and scenario analyses, might have led LTCM to take more modest bets initially, or to have withdrawn from some positions it had taken in order to reduce risk.

Instead, LTCM seems to have done just the opposite. Rather than reducing its positions in early 1998, after it had returned almost $3 billion to investors, it maintained them, effectively increasing its leverage to the desired 25-to-1 level. And when it chose to reduce its investments following its losses in May and June 1998, LTCM retained its least liquid positions while closing out its most liquid, thus magnifying liquidity risk further.

LTCM's actions may have been influenced by two factors of pertinence to the types of arbitrage strategies the firm undertook. Market neutral strategies such as LTCM's are particularly susceptible to errors in the estimated correlations between the long and short positions that comprise each relative value trade.[25] On the one hand, the higher the estimated correlation, the larger the size of the long and short positions that can be taken, because they will be more closely offsetting, hence risk-reducing. On the other hand, to the extent the estimated correlation is wrong, increasing the size of these positions increases, rather than reduces, risk.

Second, with arbitrage strategies such as LTCM's, investors may be encouraged to add risk as risk increases. That is, as spreads widen, the profit opportunity seems to increase. LTCM, of course, had chosen after the losses it experienced in May and June to hold on to the positions it considered to be the most promising, those with then-widening spreads, including interest rate spread trades and equity volatility trades. These ended up presenting LTCM with some of its biggest losses by the time of the September bailout.

Leverage and liquidity. The losses attendant on the collapse of LTCM's positions were serious but may not have been fatal. After all, the bailout preserved these positions, many of which were subsequently unwound at an apparent profit. In the year following the bailout, market liquidity improved, perceived risk declined, equity volatility fell, and spreads narrowed, in line with LTCM's long-run expectations. What proved fatal to the original LTCM, however, was its high degree of leverage combined with its lack of liquidity.

As we have noted, LTCM appears to have relied on two lines of defense in terms of its ability to sustain losses. The first defense was the assumed diversification of its trades. Once this failed, LTCM was dependent on its second line—its ability to raise funds, either by selling assets or attracting new capital. As with its assumptions about correlation, however, LTCM appears to have suffered from some fatal misconceptions about its ability to obtain liquidity.

LTCM apparently assumed that investors would always be willing to trade at what it assumed to be "fair" prices. But this assumption neglects—at some points, to an irrational degree—several important factors. First, it overlooks the fact that investors' fear can lead to panicked behavior, when the desire to sell overwhelms more rational concerns such as long-term value. In times of panic such as August 1998, investors tend to sell across the board. One result is the spike in correlations across markets that did so much damage to LTCM's investments. Another is that potential liquidity providers, including "value" investors who might be expected to step in and buy as prices decline, either get swept away by an avalanche of sell orders or move out of the way, declining to buy until prices have settled to more stable lows.[26]

Second, LTCM appears to have egregiously misread its competition. According to Haghani, LTCM "put very little emphasis on what other leveraged players were doing . . . because I think we thought they would behave very similar to ourselves."[27] Despite the closing of the Salomon U.S. arbitrage trading desk in July, LTCM seemed to believe that other arbitrageurs were going to hang on to trades as spreads widened ever further, just as LTCM had hung onto its seemingly most profitable trades in July. At best, this would mean that arbitrage actions would stabilize the widening of spreads and perhaps contribute to a narrowing, which would allow LTCM some profit. At worst, arbitrageurs trading in similar fashion to LTCM would provide potential counterparties should LTCM have to sell off or cover positions. Other hedge funds and investment banks, however, chose a different route. They reduced their risk by selling off their long positions and covering their shorts, thereby increasing the pressure on LTCM.[28]

Third, LTCM appears to have neglected to take into consideration the extreme illiquidity of many of its own positions. In some U.S. and non-U.S. futures markets, for example, LTCM's trades accounted for over 10% of open interest.[29] According to one source, the notional value of LTCM's derivative positions in the U.K. government bond market was larger than the underlying market itself.[30] And, of course, LTCM was in the business of supplying liquidity across the board, in equity and debt markets, in Japan, Europe, and the United States. It is thus hardly surprising that, when LTCM looked to markets to supply liquidity in the summer and fall of 1998, there were no suppliers.

Finally, LTCM assumed that investors or lenders would be willing to provide new capital, even as its gains turned into ever increasing losses. But investors' and lenders' willingness to support arbitrage activities is limited. It is likely to become more and more limited as arbitrage mispricings, and the uncertainty underlying them, increase.[31]

LTCM was thus unable either to liquidate assets or to raise new capital in order to meet the margin calls on its highly leveraged, losing positions. At this point, leverage effectively stopped out LTCM's strategies, at least as far as the remaining original investors were concerned. The bailout left them with a vastly reduced share of the hedge fund and a commensurately reduced share in any eventual profits.

After LTCM was finally closed, and as his own firm was being launched, Meriwether gave the final verdict: "Our whole approach was fundamentally flawed."[32]

LESSONS FOR INVESTORS

In some ways, ACM and LTCM seem entirely different. ACM seems to have failed because of basic incompetence and a lack of analytical tools. LTCM seems to have failed because more than competent professionals placed more than warranted reliance on sophisticated analytical tools.

Could investors in ACM have known before its failure that its investment approach was less than adequate? Could investors in LTCM have saved themselves by recognizing that its investment approach was fundamentally flawed?

Investors in both ACM and LTCM were undoubtedly handicapped by the lack of transparency in regard to both firms' investments. In the case of ACM, of course, this was exemplified by Askin's initial statement about the firm's performance in February 1994, in which the manager's own marks vastly understated the losses. But this statement itself was merely symptomatic of the general opacity created by the complexity of the instruments in which ACM invested. Given the difficulty the firm's own managers encountered in valuing their assets, it is hardly surprising that investors were caught unaware by the fatal lack of neutrality of the firm's portfolios.

Investors in LTCM, too, may have been stymied by the complexity of LTCM's trades, which involved a marked number of customized derivatives, as well as a truly Byzantine web of financing arrangements. LTCM's investors did not, it should be pointed out, face a stumbling block akin to the Askin February loss statement. There remains some controversy, however, over just how transparent LTCM's statements were. Until it began reaching out for more financing in September 1998, LTCM had never disclosed individual positions, for proprietary reasons. Balance sheets were received by investors monthly and by lenders quarterly; audited financial statements (including over $1 trillion notional value in off-balance-sheet positions) were released quarterly.

It could thus be argued that LTCM's investors should have had some indication of at least the risk introduced by the firm's dependence on leverage. This argument is strengthened when one considers that LTCM's investors were for the most part large financial firms (and heads of such firms); compared with ACM's investors, say, LTCM's could be expected to be vastly more sophisticated in their ability to understand the fund's investments and to read and interpret its financial statements.

Nevertheless, some of LTCM's investors, including Merrill Lynch's David Komansky, expressed surprise at the size of LTCM's positions and the firm's high leverage at the time of the bailout.[33] Such a reaction is not necessarily disingenuous. LTCM did not disclose individual positions. Only after the fact did investors and others become aware of the extent to which LTCM's investments were concentrated in interest rate swaps, particularly in the U.K. gilt market, and in equity volatility bets.

Furthermore, for LTCM, as for ACM, the timeliness of information became a problem. As we have noted, ACM's counterparties appear to have been slow in evaluating their exposures to the firm, and this turned into a problem for ACM, and its investors, when the firm was suddenly faced with a flood of margin calls in late March 1994. LTCM investors may have been similarly overtaken by events in August and September 1998.

The effect of these events may be seen in the dramatic and rapid involuntary increase in the firm's leverage at this time. After its liquidation of some of its assets in July, LTCM's leverage ratio rose to about 30-to-1. With the firm's substantial losses in August, however, leverage jumped to 55-to-1. And by the time of the bailout in September it was up to over 100-to-1. (None of these figures takes into account the firm's over $1 trillion in notional value of derivatives positions.) It is evident that even the firm's managers did not anticipate a leverage ratio of this magnitude.

Investors in both firms seem to have been lulled by the perception that their investments were inherently low risk.[34] This perception may have been heightened by the claims made on behalf of both firms in their promotional materials and letters to investors; these included both firms' claims of market neutrality. Investors may also have been seduced by the healthy early returns to both ACM and LTCM portfolios, as well as by the reputations of the firms' general partners.

But high returns, combined with apparently low risk, might better have served as a yellow rather than a green light to investors. When the difficulties at LTCM began to become known, Nobel laureate William Sharpe commented: "Most of academic finance is teaching that you can't earn 40% a year without some risk of losing a lot of money."[35] Investors would have done themselves a favor had they been much more exacting in examining the sources of returns at both firms.

A better understanding of the returns at ACM might have revealed their option-like character and their acute sensitivity to changes in the interest rate environment. A better understanding of LTCM's trades might have revealed that relative value arbitrage premised on historical relationships is inherently riskier than arbitrage trades that are connected by more fundamental roots.

Some market neutral strategies are inherently more "neutral" than others. A basis trade in bond arbitrage achieves neutrality via the mathematical convergence of values at the expiration of the futures contract. A merger arbitrage trade achieves it through the expected convergence of the values of two firms at merger (with the attendant risk of course, that the merger will be called off). Equity market neutral relies on fundamental similarities between diversified baskets of long and short equity positions. Many of LTCM's relative value trades seem to have relied on offsetting positions in historically inversely correlated markets, which left open the possibility that divergences between these markets (both from each other and from historical norms) could wreak havoc with market neutrality (which it did).

In ACM's case, investors may have questioned the effectiveness of its long-long approach to achieving neutrality. In LTCM's case, they may have taken a closer look at the degree to which neutrality depended on assumptions based on historical behavior in markets that had been known to display significant divergences from historical norms.

Investors in both ACM and LTCM could also have benefited from examining the degree to which returns were dependent on leverage. Would investors in LTCM have paused, had they realized that the firm's return on assets in 1995 amounted to about 2.45%, versus the 59% return on equity reported?[36] In fact, at both firms, investors (and managers) appear to have had only a limited appreciation of the effects of leverage on investment risk, as opposed to investment return.

Investors (and markets generally) seem to have relied on the assumption that the levels of leverage at both firms would be policed by the entities on the lending side. Alan Greenspan himself asserted, shortly before the failures of LTCM necessitated a bailout: "Hedge funds are strongly regulated by those who lend the money."[37] As LTCM's collapse made evident, this was not the case; indeed, in the wake of the bailout, report after report from government committees, quasi-governmental authorities, and self-regulatory bodies called for higher standards of practice for lending institutions.

Investors in portfolios that use leverage must realize that lenders have their own interests at heart. With both ACM and LTCM, lenders were extremely liberal as long as they could expect a benefit in return. In ACM's case, dealers made special arrangements to accommodate the firm's less than triple-A credit rating, because it was in their interests to have ACM as a buyer of last resort of their "toxic waste." LTCM, similarly, was extended favorable treatment, including no-haircut repo deals, by firms that expected to be able to infer the nature of LTCM's trades and piggyback on them. By the same token, lenders pulled back when losses at ACM and LTCM threatened to turn into defaults.

Investors must make their own evaluations of leverage. What are the sources of leverage? Derivatives positions with low margin requirements? Short sales? Lending banks? Repo arrangements? Do lenders have an adequate safety cushion, in terms of haircuts or interest payments or excess collateral, should collateral values decline suddenly? Does the borrower set aside a large enough cash reserve? Can the borrower reasonably expect to be able to sell assets or raise additional capital in order to meet demands from creditors?

In addressing these questions, investors (and managers) must keep in mind how underlying market forces can affect leverage. As LTCM and ACM discovered, sharp market declines tend to be accompanied not only by losses that increase leverage levels, but also by a drying up of liquidity. Thus leveraged investors may find themselves in the uncomfortable position of having to meet increased margin calls just at a time when their ability to sell assets or raise capital is most curtailed.[38]

These effects will differ across different types of market neutral strategies, however. LTCM faced margin calls because of losses in both its long and short positions; at the same time, its ability to sell illiquid long positions was severely limited. However, as we noted in "Questions and Answers About Market Neutral Investing," abrupt market declines tend to result in added liquidity for market neutral equity strategies, as marks to market on short positions are in the investor's favor.

It seems that investors may have learned some lessons from LTCM. In raising money for his new hedge fund, John Meriwether was quick to point out that it would use less leverage, assume less risk, and be much more transparent than LTCM; its trades would also be poised to take advantage of the kind of "outlier" market behavior that "did in" LTCM. Nevertheless, Meriwether was able to raise only about a sixth of the initial capital he had hoped for.

One might nevertheless ask, if investors learned from LTCM after it failed, why hadn't they learned enough from ACM's failure to have avoided LTCM in the first place? The answer undoubtedly lies in the very human natures of all involved, managers, lenders and investors. We all want something for nothing, and an investment that promises high returns at no or little risk may be impossible to resist, for long.

NOTES

[1] Harrison J. Goldin, *Final Report of Harrison J. Goldin, Trustee to The Honorable Stuart M. Bernstein, Judge, United States Bankruptcy Court, Southern District of New York, In re Granite Partners, L.P., Granite Corporation and Quartz Hedge Fund, New York*, April 18, 1996, p. 25.

[2] The trustee in bankruptcy later concluded that the Bear Stearns margin call on March 29 was improper, because the collateral Bear Stearns held had been improperly valued because based upon a haircut larger than the terms specified in the repo agreement. The trustee extended this finding to argue that, had Bear Stearns properly valued its exposure to ACM, ACM's liquidation on March 30 may have been forestalled, at least until April 1, during which time a more orderly buyout of the firm's assets might have been arranged.

[3] Goldin, *Final Report*, p. 311.

[4] The trustee's report (Goldin, *Final Report*, p. 27) quotes Askin as saying that "at least 50%" of his decisions to buy or sell a bond were based on his "extensive market experience and gut instinct."

[5] Goldin, *Final Report*, p. 28.

[6] Goldin, *Final Report*, p. 68.

[7] Goldin, *Final Report*, p. 68.
[8] Goldin, *Final Report*, p. 71.
[9] Goldin, *Final Report*, p. 74.
[10] Goldin, *Final Report*, p. 76.
[11] Goldin, *Final Report*, p. 312.
[12] Goldin, *Final Report*, p. 311.
[13] For descriptions of these and other strategies, see David M. Modest, "Long-Term Capital Management: An Internal Perspective," Presentation to the Institute for Quantitative Research in Finance, Palm Springs, CA, October 18, 1999; Andre Perold, "Long-Term Capital Management, L.P.," Working paper no. N9-200-007, Harvard Business School, November 5, 1999; and Nicholas Dunbar, *Inventing Money: The Story of Long-Term Capital Management and the Legends Behind It* (Chichester, England: John Wiley & Sons, 2000).
[14] Modest, "Long-Term Capital Management: An Internal Perspective."
[15] Perold, "Long-Term Capital Management, L.P."
[16] Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management* (New York: Random House, 2000), p. 110.
[17] Philippe Jorion, "Risk Management Lessons from Long-Term Capital Management," *European Financial Management*, September 2000.
[18] William J. McDonough, Statement before the U.S. House of Representatives Committee on Banking and Finance Services, Washington, DC, October 1, 1998.
[19] Myron S. Scholes, "The Near Crash of 1998: Crisis and Risk Management," *AEA Papers and Proceedings*, May 2000; and David M. Modest, "Long-Term Capital Management: An Internal Perspective."
[20] Michael Lewis, "How the Eggheads Cracked," *New York Times Magazine*, January 24, 1999.
[21] Myron Scholes ("The Near Crash of 1998: Crisis and Risk Management") has suggested that the IMF should shoulder some of the responsibility for this event: "Maybe part of the blame for the flight to liquidity lies with the International Monetary Fund (IMF). Investors believed that the IMF had given implicit guarantees to protect their investments against country-specific risks in the underdeveloped and less-developed regions of the world. But when Russia defaulted on its debt obligations, market participants realized that the implicit guarantees were no longer in place." Ironically, Scholes alludes to a problem that many were to focus on with the bailout of LTCM—the problem of moral hazard created when investors are rescued from their own mistakes.
[22] Some have suggested that LTCM's actions during this time were driven more by gut instinct and greed than by models. Myron Scholes ("The Near Crash of 1998: Crisis and Risk Management") states that: "In truth, mathematical models and option pricing models played only a minor role, if any, in LTCM's failure. At LTCM, models were used to hedge local risks. LTCM was in the business of supplying liquidity at levels that were determined by its traders." Lowenstein (*When Genius Failed: The Rise and Fall of Long-Term Capital Management*) writes that many trades during this period were undertaken at the insistence of the firm's traders, with little or no regard for risk exposures or market neutrality.
[23] Lewis, "How the Eggheads Cracked."

[24] Bruce I. Jacobs, *Capital Ideas and Market Realities: Option Replication, Investor Behavior, and Stock Market Crashes* (Oxford: Blackwell Publishers, 1999) and Bruce I. Jacobs, "When Seemingly Infallible Arbitrage Strategies Fail," *Journal of Investing*, Spring 1999.
[25] Jorion, "Risk Management Lessons from Long-Term Capital Management."
[26] Jacobs, *Capital Ideas and Market Realities: Option Replication, Investor Behavior, and Stock Market Crashes*.
[27] Lewis, "How the Eggheads Cracked."
[28] Meriwether was later to place much of the blame on competitors: "The hurricane is not more or less likely to hit because insurance has been written. In the financial markets, this is not true. The more people write financial insurance, the more likely it is that a disaster will happen, because the people who know you have sold the insurance can make it happen" (Lewis, "How the Eggheads Cracked"). This, of course, ignores the effects that LTCM and other insurers themselves have on the markets, which can be disastrous (see Jacobs, *Capital Ideas and Market Realities: Option Replication, Investor Behavior, and Stock Market Crashes*).
[29] President's Working Group on Financial Markets, "Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management," Washington, DC, April 1999.
[30] Dunbar, *Inventing Money: The Story of Long-Term Capital Management and the Legends Behind It*.
[31] A. Shleifer and R. W. Vishny, "The Limits of Arbitrage," *Journal of Finance* 52 (1997), pp. 35–55.
[32] See Gregory Zuckerman, "Long-Term Capital Chief Acknowledges Flawed Tactics," *Wall Street Journal*, August 21, 2000, p. C1.
[33] *New York Times*, October 23, 1998, p. C22.
[34] Investors are naturally attracted to apparently low-risk strategies that seem to be able to provide returns that are out of line with the risks taken. However, as described in Bruce I. Jacobs, "Risk Avoidance and Market Fragility," *Financial Analysts Journal*, January/February 2004, some of these strategies can end up creating risk for investors.
[35] *Wall Street Journal*, November 16, 1998, p. A19.
[36] Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management*, p. 78.
[37] Alan Greenspan, Testimony before the U.S. House of Representatives Banking Committee, Washington, DC, September 16, 1998.
[38] The investment problems related to market illiquidity—particularly the sudden drying-up of liquidity—are difficult to foresee from the vantage point of continuous-time models. However, new tools are becoming available, including asynchronous simulation models that allow one to model more successfully such extreme events. See, for example, Bruce I. Jacobs, Kenneth N. Levy, and Harry M. Markowitz, "Financial Market Simulation," *Journal of Portfolio Management*, 30th Anniversary Issue, 2004.

CHAPTER 10

Significant Tax Considerations for Taxable Investors in Market Neutral Strategies

Peter E. Pront, Esq.
Partner
Seward & Kissel LLP

John E. Tavss, Esq.
Partner
Seward & Kissel LLP

This chapter summarizes the significant federal income tax considerations relating to various market neutral investment strategies implemented by taxable investors who are U.S. citizens, residents or entities. The following chapter, Chapter 11, "Tax-Exempt Organizations and Other Special Categories of Investors: Tax and ERISA Concerns," addresses the special tax and ERISA issues of concern to tax-exempt organizations, certain foreign corporations, and mutual funds that utilize market neutral investment strategies.

This chapter addresses tax issues relating to short sales, merger arbitrage transactions, convertible debt securities, notional principal contracts, options, regulated futures contracts, and straddles. Because of the complexity of many of the tax rules applicable to market neutral strategies and the multitude of strategies that may be implemented, we cannot address all the special rules that may apply to such strategies. Institutional investors should consult with their own tax advisers to ascertain the federal income tax consequences of their particular strategies.

The discussion assumes that the securities held by the taxable investor constitute capital assets and are not held by the investor primarily for sale to customers in the ordinary course of a trade or business (i.e., the investor is not a "dealer" in securities). The discussion is based on the Internal Revenue Code of 1986, as amended (the "Code"); existing and proposed regulations issued by the Treasury Department; and judicial decisions and administrative pronouncements, as they exist as of July 1, 2003. All of these are subject to change, possibly with retroactive effect.

As a preliminary matter, it is important to note a crucial consideration relating to the legal structure of market neutral investments. Market neutral strategies can involve financial leverage or potential exposure greater than the amount of capital invested. Investors that utilize a leveraged market neutral strategy in their own names (e.g., by employing a market neutral investment manager to manage the assets in a managed account) may incur losses in excess of the capital contributed to the account. Investors considering market neutral strategies should therefore pay careful attention to the structure of the investment arrangement.

Such investors may find it prudent to access market neutral strategies through an investment in a limited liability entity (e.g., a limited partnership interest, an interest in a limited liability company, or an interest in some other entity affording liability protection). Contrary to the managed account scenario, losses to a limited partner or a member of such a limited liability company are generally restricted to the capital it invested in the entity. While this form of investment generally involves some pooling of assets with other limited partners or other limited liability company investors, the investor can eliminate any risk to its other assets by creating a limited liability company in which it is the sole member.

SHORT SALES

As discussed in earlier chapters, short sales are part of many market neutral investment strategies, including long-short equity strategies, merger arbitrage, and convertible arbitrage. A "short sale" generally occurs when an investor borrows securities from another party (the "lender," usually a broker–dealer) and then sells those securities to a third party. The short seller agrees to deliver to the lender at a future date securities identical to those borrowed. The short sale is consummated, or closed, at the time such delivery is made [Treasury Reg. §1.1233-1(a)(1)]. Typically, the shorted securities are readily available on the market and may be acquired by the short seller at any time prior to the closing of the short sale.[1]

Upon the sale of the borrowed securities, the short seller generally deposits with the lender the net proceeds of the short sale as collateral for its repayment obligation. The lender typically credits the short seller's account with an amount approximately equal to the income earned on this collateral (a "rebate fee"). Correspondingly, the short seller must generally pay the lender a premium or fee for the privilege of borrowing the shorted securities and will usually be required to reimburse the lender for any dividends or interest paid on the shorted securities during the period the short sale is open.

In general, the short seller recognizes a gain or loss on the short sale on the date the sale is closed, not on the date the short sale is made [Treas. Reg. §1.1233-1(a)(1) and *Revenue Ruling* 72-478, 1972-2 C.B. 487]. The amount of such gain or loss will equal the difference between the net amount of the proceeds derived from the short sale and the short seller's tax basis in the securities repaid to the lender. If the short seller uses a capital asset to close the short sale, the gain or loss will be capital in nature, and if the short seller uses an ordinary asset to close the short sale, the gain or loss will be ordinary in nature [Code sec. 1233(a)]. The determination of whether a capital gain or loss is short term or long term will generally depend (with the special exceptions discussed below) on the length of time the short seller held the securities used to close the short sale (i.e., whether this holding period is more than 12 months).

Constructive Sales Rules

Special gain recognition rules apply to "short sales against the box." For example, if the short seller[2] holds an "appreciated financial position"[3] that is the "same or substantially identical"[4] to the securities shorted, the short sale will usually result in the "constructive sale" of the appreciated position on the date of the short sale [Code sec. 1259(c)(1)(A)]. Further, if an existing short sale position has appreciated in value, the short seller's subsequent acquisition of the "same or substantially identical" securities (regardless of whether the acquired property is actually used to cover the short sale) will usually result in the "constructive sale" of the appreciated short position [Code sec. 1259(c)(1)(D)]. Therefore, under current law, a sale of appreciated stock "short against the box" will generally constitute a constructive sale of such stock.[5]

In most cases, a constructive sale requires the short seller to recognize a gain as if the appreciated financial position were sold, assigned or otherwise terminated at its fair market value on the date of the constructive sale [Code sec. 1259(a)(1)]. The tax basis of any appreciated financial position that has been treated as constructively sold is increased by the amount of the recognized gain in order to avoid double taxation of such gain upon a subsequent actual sale of the position [Code sec. 1259(a)(2)(A)]. In addition, the short seller begins a new holding period in the appreciated financial position as if the position were originally acquired on the date of the constructive sale [Code sec. 1259(a)(2)(B)].

A short sale against the box will not result in a constructive sale if all of the following conditions are satisfied: (a) the short sale is closed before the end of the 30th day after the close of the taxable year; (b) the short seller holds the appreciated financial position throughout the 60-day period beginning on the date the short sale is closed; *and* (c) at no time during the 60-day period is the short seller's risk of loss with respect to the appreciated financial position reduced by reason of a transaction such as holding an option to sell, an obligation to sell, or a short sale, or being the grantor of a call option, or certain other transactions diminishing the short seller's risk of loss [Code secs. 1259(c)(3) and 246(c)(4)].

Special Holding Period Rules

In general, the determination of whether a capital gain or loss realized on any short sale is treated as long term or short term will depend on how long the short seller has held the securities used to close the short sale. However, when the short seller holds or acquires securities that are "substantially identical" to the securities sold short, special rules apply. The Congress adopted these rules to prevent the use of short sales to convert short-term capital gains into long-term capital gains and long-term capital losses into short-term capital losses. The following special rules now apply to situations where the gain or loss from a short sale is considered to be derived from the sale or exchange of a capital asset [Code sec. 1233(a) and Treas. Reg. §1.1233-1(c)(1)].

> **Rule 1:** If either (a) on the date of the short sale the short seller held securities "substantially identical"[6] to the securities sold short for a period of one year or less, or (b) the short seller acquires "substantially identical" securities after the short sale and on or before the date the short sale is closed, any gain (but not loss) realized on the securities used to cover the short sale will be a short-term capital gain to the extent of the quantity of the "substantially identical" securities. **Rule 1** applies even if the short seller has held the securities actually used to close the short sale for more than one year and regardless of how much time elapses between the short sale and the closing date [Code sec. 1233(b)(1) and Treas. Reg. §1.1233-1(c)(2)].

> **Rule 2:** The holding period for any "substantially identical" securities subject to **Rule 1** (i.e., securities held for one year or less, or acquired after the short sale and on or before the date the short sale is closed)

will, to the extent of the quantity of securities sold short, be deemed to have begun on the earlier of (a) the date the sale is closed, or (b) the date the securities are sold or otherwise disposed of. If the "substantially identical" securities were acquired on different dates, **Rule 2** applies to these securities in the order in which they were acquired (beginning with the earliest acquisition) [Code sec. 1233(b)(2) and Treas. Reg. §1.1233-1(c)(2)].

Rule 3: If, on the date of a short sale, any "substantially identical" securities have been held by the short seller for more than one year, any loss (but not gain) realized on the securities used to close the short sale will be a long-term capital loss to the extent of the quantity of such "substantially identical" securities and regardless of how long the short seller has held the securities actually used to close the short sale [Code sec. 1233(d) and Treas. Reg. §1.1233-1(c)(4)].

Exhibit 10.1 provides examples that illustrate the operation of **Rules 1** through **3**. Each example assumes that the securities used to close the short sales constitute capital assets of the short seller.

EXHIBIT 10.1 **Determining Effective Holding Periods for Short Sales under** Rules 1 **through** 3

Example 1: On January 2, 1999, X buys 100 shares of Y Corporation stock for $10 per share. On January 3, 1999, X buys another 100 shares of Y for $10 per share. On July 1, 1999, X sells 100 shares of Y short at $16 per share and identifies the 100 shares of Y stock purchased on January 3, 1999 as the shares being hedged. On January 10, 2000, X closes the short sale by delivering to the lender the 100 shares of Y purchased on January 2, 1999. X continues to hold the 100 shares of Y purchased on January 3, 1999 beyond March 11, 2000.

As a result of these transactions, X realizes a $600 capital gain on the short sale (i.e., $1,600 sales price less $1,000 tax basis of Y shares used to close the short sale). Under general taxation rules, the $600 gain would be treated as a long-term capital gain because X held the Y shares used to cover the short sale for more than one year at the time of closing. However, under **Rule 1**, the entire $600 gain is treated as a short-term capital gain, because, on the date of the short sale, X owned securities "substantially identical" to the shares shorted for one year or less [Treas. Reg. §1.1233-1(c)(6), Ex. 1]. The short sale on July 1, 1999 does not result in a constructive sale of 100 shares of Y, because X closed this short sale within 30 days of the end of 1999 and maintained a long position in the remaining 100 shares of Y without entering into any risk-reducing transaction with respect to those shares.

EXHIBIT 10.1 (Continued)

Example 2: On January 2, 1999, X buys 100 shares of Y Corporation for $10 per share. On July 1, 1999, X sells 100 shares of Y short at $16 per share. On August 1, 1999, X purchases another 100 shares of Y at $18 per share and closes the short sale on that date by delivering to the lender the newly purchased shares and identifying those shares as used to effect the closing. On February 2, 2000, X sells the 100 shares of Y purchased on January 2, 1999 for $20 per share.

X realizes a $200 short-term capital loss on closing the short sale (i.e., the difference between the $1,600 sales price and the $1,800 cost of Y shares used to close the short sale). In addition, X realizes a $1,000 capital gain on February 2, 2000, on the sale of the 100 shares of Y purchased on January 2, 1999 (i.e., $2,000 sales price less the $1,000 cost of the shares purchased on January 2, 1999). Under general tax rules, this $1,000 gain would be treated as a long-term capital gain, because X had held the Y shares for 13 months on the date of sale. However, under **Rule 2**, X's holding period for those shares is deemed to commence on the date the short sale was closed (i.e., August 1, 1999), so the $1,000 gain is treated as a short-term capital gain [Treas. Reg. §1.1233-1(c)(6), Ex. 2]. X did not enter into a constructive sale of the Y stock in 1999 pursuant to the special exception for closing transactions [Code sec. 1259(c)(3)].

Example 3: On February 1, 1999, X sells short 100 shares of Y Corporation at $16 per share. On March 1, 2000, X purchases 250 shares of Y at $10 per share and holds these shares until April 1, 2001, then uses 100 of the 250 shares to close the short sale.

X realizes a $1,600 capital gain (i.e., $1,600 sales price less $1,000 cost of shares used to close the short sale) upon entering into the short sale pursuant to the constructive sales rules [Code sec. 1259(c)(1)(D)]. Under **Rule 1**, this gain would be treated as a short-term capital gain, because X acquired "substantially identical" securities after the short sale and before the sale was closed. X's holding period in the remaining 150 shares of Y is not affected by **Rule 2** because this amount of "substantially identical" securities exceeds the quantity of Y shares sold short [Treas. Reg. §1.1233-1(c)(6), Ex.4].

Example 4: On February 1, 1999, X buys 100 shares of Y Corporation at $10 per share. On March 1, 2000, X sells short 100 shares of Y at $10 per share. On April 1, 2000, X buys another 100 shares of Y for $12 per share and closes the short sale with these newly purchased shares.

X is not treated as having entered into a constructive sale by reason of the March 1, 2000 short sale of 100 shares of Y, because these shares do not constitute an appreciated financial position as of that date [Code sec. 1259(b)(1)]. X realizes a $200 capital loss on the closing of the short sale (i.e., $1,000 sales price minus $1,200 cost of the shares used to close the sale). Under general rules, this loss would be a short-term capital loss because X held the shares used to close the short sale for only one month. However, under **Rule 3**, this loss would be treated as long term because, on the date of the short sale, X held securities "substantially identical" to the Y shares for more than one year [Treas. Reg. §1.1233-(1)(c)(6), Ex. 3].

Payments Made In Connection with Short Sales

The premium paid by a short seller to a lender of the securities is generally treated as an interest expense (subject to the limitations on the deductibility of investment interest), rather than a miscellaneous itemized deduction [Code secs. 67(a)(8) and 163(d)(3)(C)]. As a result, the short seller's ability to deduct the premium in the current tax year will be limited by the amount of investment income it received for the year; any excess interest expense may be carried over to offset the short seller's investment income in future years. Further, if the short seller uses the short sale proceeds to purchase or carry tax-exempt state or local municipal debt obligations, the premium is treated as interest expense for purposes of the general rule prohibiting the deduction of interest expense incurred or continued to purchase or carry tax-exempt obligations [Code sec. 265(a)]. This rule does not, however, apply if the short seller provides cash as collateral for the short sale and does not receive material earnings on such cash [Code secs. 265(a)(2) and (5)].

Whether the short seller is entitled to deduct the payments made to reimburse the lender for dividends it received on the shorted securities depends principally on (a) whether the dividends were paid in cash or in the stock of the issuer; (b) if a cash dividend was paid, the period the short sale was open; and (c) whether the short seller was compensated for permitting the lender to use the collateral provided by the short seller in connection with the stock borrowing. If the issuer pays a cash dividend and the short sale has been held open for less than 46 days, any substitute dividend paid to the lender by the short seller will generally be deductible only to the extent of the amount of ordinary income received by the short seller as compensation for the lender's use of collateral. The short seller must add any nondeductible amount to the tax basis in the securities used to close the short sale [Code secs. 263(h)(1) and (5)].

Under current law, the principal tax issue to an individual lender that receives from a short seller payments in lieu of dividends paid on borrowed stock is whether these payments qualify for the special tax treatment applicable to "qualified dividend income." Under the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the "2003 Tax Act"), "qualified dividend income" received by an individual is taxed at the maximum federal tax rate applicable to net long-term capital gain income, which is currently 15% [Code sec. 1(h)(11)(B)]. The reduced tax rate applies to "qualified dividend income" received from January 1, 2003 through December 31, 2008. "Qualified dividend income" generally includes dividends received from domestic corporations and certain foreign corporations, but does not include the following dividends: (a) dividends on stock of a tax-exempt corporation; (b) dividends paid by certain banking institutions; (c) dividends on stock owned for less than

60 days in the 120-day period surrounding the ex-dividend date; and (d) dividends on stock where related payments must be made with respect to substantially similar or related property.

The Internal Revenue Service (IRS) takes the position that "substitute" dividend payments made by a short seller are taxed as "other income" to the lender, rather than as "dividend" income [IRS Publication 550, p. 52]. Consistent with this position, the legislative history to the 2003 Tax Act expressly provides that such "substitute" payments do not constitute "qualified dividend income" to an individual lender and will therefore not be eligible for the reduced tax rate introduced by the 2003 Tax Act.[7] Thus individual securities lenders may consider demanding a premium from the borrower to reflect the fact that, by lending their stocks, they have effectively converted dividend income otherwise taxable at a maximum 15% rate into ordinary income taxable at their respective marginal tax rates.

"Extraordinary dividends" paid on the shorted securities warrant special treatment. A dividend payment is considered "extraordinary" if the amount of a cash dividend equals at least 10% (5% in the case of a short sale of preferred stock) of the amount the short seller realized from the short sale. In that case, if the short sale has been open less than 366 days, the short seller must capitalize the substitute payment, rather than deducting it currently. For this purpose, all dividends paid on shorted securities that have ex-dividend dates within the same 85 consecutive-day period are treated as a single dividend [Code sec. 263(h)(2)].

If the short sale has been held open for the requisite period (i.e., 46 days for ordinary dividends and 366 days for extraordinary dividends), the amount paid by the short seller to reimburse the lender for cash dividends on the shorted stock is generally deductible as an investment interest expense. However, the substitute dividend payment will not be deductible if the short seller's sole motive was to reduce taxes or to offset capital losses, rather than to make a profit [see *Hart v. Commissioner*, 338 F.2d 410 (2d Cir. 1964)].

For purposes of determining the length of time a short sale has been open, time is considered suspended during any period in which (a) the short seller holds, has an option to buy, or is under a contractual obligation to buy securities that are "substantially identical" to those sold short, or (b) as set forth in Treasury regulations, the short seller has diminished its risk of loss by holding one or more other positions in "substantially similar or related property" [Code sec. 263(h)(4)].

Any costs incurred by the short seller to purchase additional shares of stock to reimburse the lender for nontaxable stock dividends or liquidating dividends on the shorted securities are always capital expenditures. These costs are added to the short seller's tax basis in the securities used to close the short sale [*Revenue Ruling* 72-521, *supra*].

Acquisition of Put Options as Short Sales

For purposes of **Rules 1** and **2** discussed above, the acquisition of a put option (i.e., an option to sell assets at a fixed price) is considered a short sale, and the exercise or failure to exercise a put option is considered to be a closing of the short sale [Code sec. 1233(b) and Treas. Reg. §1.1233-1(c)(3)].[8] The exercise or failure to exercise a put option is not considered a closing for the purposes of **Rule 3**.

If an investor buys a put option when it holds securities "substantially identical" to those underlying the option, capital gain and holding period determinations could be affected. For example, if the investor acquires a put option when it has held the stock underlying the option for one year or less, under **Rule 2** the original holding period of the underlying stock is terminated and a new holding period is deemed to begin when the put either is exercised or lapses. Under **Rule 1**, any gain realized upon the exercise or lapse of the put option is treated as a short-term capital gain.

Purchase of a put will not affect the holding period of the investor's position in the underlying securities if the option qualifies as a "married put." This will be the case if the following requirements are met: (a) the investor acquires on the same day both the put option and the securities the investor intends to use in exercising the option; (b) either the option specifies that these securities are to be used in exercising the option or the investor's records identify these securities as the ones to be used within 15 days after their acquisition; and (c) the securities so identified are sold by the investor if the put is exercised. The holding period of the securities underlying a married put is excepted from the application of **Rule 2**, so the investor can receive a long-term capital gain on a sale of the underlying securities even though the acquisition of the put reduces the investor's risk of loss from owning such securities. (**Rules 1** and **2** will apply, however, if securities other than those identified are sold upon exercise of the put.) If the put option lapses, the cost of the option is added to the basis of the securities to which the put was "married" [Code sec. 1233(c) and Treas. Reg. §1.1233-1(c)(3)].

Short Sale Rules and Arbitrage Operations

In determining the holding period of short sales made in connection with "arbitrage operations in securities," the applicability of **Rule 2** (as described above) is restricted by a special statutory exception [Code sec. 1233(f)]. This exception is intended to prevent **Rule 2** from applying to nonarbitrage securities that are "substantially identical"[9] to securities involved in arbitrage operations.[10]

The term “arbitrage operations” is defined as transactions involving the purchase and sale of securities (or the right to acquire securities) entered into for the purpose of profiting from the current difference between the price of the asset purchased and the price of the asset sold. Further, the securities purchased must either be identical to the securities sold (e.g., the same stock trading for different prices on different exchanges) or must entitle the owner to acquire securities identical to the securities sold (e.g., bonds convertible into stock) [Code sec. 1233(f)(4)].[11]

To qualify as an arbitrage operation, a transaction must be properly identified in the investor’s records on the day it occurs or as soon thereafter as practicable [Code sec. 1233(f)(4)]. Securities that have been properly identified as acquired for arbitrage operations will continue to be treated as such, even if they are sold outright, rather than being used to complete the arbitrage operation [Treas. Reg. §1.1233-1(f)(3)].

When a short sale is entered into as part of an arbitrage operation, **Rule 2** applies first to “substantially identical” securities acquired for arbitrage operations that are held at the close of business on the day the short sale is made. However, **Rule 2** will apply to “substantially identical” securities that the investor holds for purposes other than arbitrage only if the amount of securities sold short in the arbitrage operation exceeds the amount of “substantially identical” securities acquired for arbitrage operations [Code sec. 1233(f)(1) and Treas. Reg. §1.1233-1(f)(1)(i)]. See Example 1 in Exhibit 10.2.

This special restriction with respect to the applicability of **Rule 2** to arbitrage operations will not apply if a “net short position” is created with securities held for arbitrage purposes [Code sec. 1233(f)(2)]. A net short position is created when “substantially identical” securities acquired for arbitrage operations are sold or otherwise disposed of without closing the short sale that was entered into as part of such operations [Treas. Reg. §1.1233-1(f)(1)(ii)]. In such event, a short sale in the amount of the net short position is deemed to have been made on the date the net short position is created, and **Rule 2** will apply to this deemed short sale as if it were not entered into as part of an arbitrage operation. Therefore, the holding period of any “substantially identical” securities not acquired for arbitrage operations will be determined by **Rule 2**. See Example 2 in Exhibit 10.2.

MERGER ARBITRAGE

Investors engage in merger or risk arbitrage in anticipation of, or upon the announcement of, a possible corporate acquisition. An arbitrageur

EXHIBIT 10.2 Applicability of Rule 2 **Governing Holding Periods for Short Sales to Certain Arbitrage Operations**

Example 1: On August 15, 1999, X buys 100 convertible bonds of Y Corporation for purposes other than arbitrage operations. The bonds are convertible into the common stock of Y Corporation on the basis of one bond for one share of stock. On November 1, 1999, X sells short 100 shares of common stock of Y Corporation in a transaction identified as part of an arbitrage operation. On the same day, X buys another 100 convertible bonds of Y Corporation in a transaction identified and intended to be part of the same arbitrage operation. On the basis of all of the facts, the bonds acquired on August 15, 1999 and November 1, 1999 are substantially identical to the common stock of Y Corporation (because the bonds entitle X to acquire the common stock of Y Corporation).

On December 1, 1999, X closes the November 1 short sale with 100 shares of common stock of Y Corporation acquired on December 1. Under **Rule 2**, the holding period of the bonds acquired on November 1 begins on December 1 (the date the short sale is closed). Pursuant to the special statutory exception of Code section 1233(f), however, the holding period of the bonds acquired on August 15 is not affected by the arbitrage transactions. This same result would occur if, instead of purchasing the 100 shares of common stock of Y Corporation on December 1, X had converted the bonds acquired on November 1 into common stock and then used this stock to close the short sale on December 1 [Treas. Reg. §1.1233-1(f)(iii), Ex. 1].

Example 2: Assume the same facts as in Example 1 above, except that, on December 1, 1999, X sells the bonds acquired on November 1 (or converts these bonds into common stock of Y Corporation and then sells the stock) but does not close the November 1 short sale. The sale of the bonds (or stock) creates a net short position in assets acquired for arbitrage operations, and this position is deemed to be a short sale made on December 1. Accordingly, the holding period of the bonds acquired on August 15 begins on the date the short sale is closed, or on the date of any disposition of the bonds, whichever occurs first [Treas. Reg. §1.1233-1(f)(1)(iii), Ex. 2].

typically acquires shares of stock in the target corporation based on the belief that these shares are trading at a discount to the price that the acquiring corporation will pay if the acquisition occurs.

In a cash acquisition (where the acquirer offers to pay cash for the target), the arbitrageur merely holds the target's stock until the acquisition occurs and receives the difference between the purchase price it paid and the price paid by the acquirer (which generally includes a premium above the stock's market price). In the case of a stock acquisition (where the acquirer offers to exchange its stock for the stock of the target), after the announcement of the proposed acquisition, the arbitrageur typically purchases shares of the target and also sells short shares of the acquirer (although, in some cases, the arbitrageur will purchase shares of the acquirer and sell short shares of the target). The arbitrageur is essentially speculating that the stock of the target will subsequently appreciate in value and/or the stock of the acquirer will subsequently decline in value. The arbitrageur in this case will receive the difference between the proceeds received from the short sale and the purchase price paid for the target's shares. Regardless of the structure of the particular risk arbitrage transaction, the key risk assumed by the arbitrageur is that the proposed acquisition will not be consummated.

The principal federal income tax issues in merger arbitrage transactions relate to the applicability of the short sale and constructive sale rules described in the previous section. These issues are discussed below.

Constructive Sale Rules

As discussed above with regard to short sales, a constructive sale will occur with respect to an appreciated financial position if either (a) the arbitrageur enters into a short sale of the "same or substantially identical" securities [Code sec. 1259(c)(1)(A)], or (b) the appreciated financial position itself is a short sale and the taxpayer acquires "the same or substantially identical" securities as the shorted securities [Code sec. 1259(c)(1)(D)]. In determining the applicability of the constructive sale rules to merger arbitrage transactions involving stock acquisitions, the key issue is whether the stock of the acquirer and the stock of the target are "substantially identical" either at the time the arbitrage positions are established or at some time on or before the closing of the short position. The applicability of the constructive sale rules may also depend on whether the arbitrageur sells short the stock of the acquirer or the target.

The stock of one corporation is generally not considered to be "substantially identical" to the stock of another corporation. In the case of a corporate reorganization, however, the stocks of the different corporations involved may be considered to be "substantially identical," depending upon the particular facts and circumstances [Treas. Reg. §1.1233-1(d)(1)]. Unfortunately, there is no definitive authority on this issue. The Treasury regulations concerning the short sale rules state that the securities to be received in a corporate reorganization or recapitalization, "traded in on a when-issued basis," may be "substantially identical" to securities to be exchanged in such reorganization or recapitalization [Treas. Reg. §1.1233-1(d)(1)].[12]

In the context of a merger arbitrage transaction, the crucial consideration in the "substantially identical" analysis appears to be the legally binding status of the underlying corporate acquisition at the time the long and short positions in the stock of the target and the acquirer are established. While there is no definitive authority directly on point, the view generally prevailing among tax practitioners is that the stocks of the acquirer and the target are not "substantially identical" prior to the date the corporate acquisition is approved by the shareholders of the target (and, if necessary, the acquirer). Until that date, the arbitrageur takes substantial risks because there is no assurance that the acquisition will in fact occur or what the exact stock exchange ratio will be if it does occur. After this date, the stock prices of the two corporations begin to track each other closely, even prior to the closing of the acquisition.[13]

If the arbitrageur enters into either a long or short position in a merger arbitrage transaction after the acquirer's acquisition of the target has been approved by the shareholders, the stocks of the two corporations are likely to be considered "substantially identical" for purposes of the constructive sale rules. The remainder of this discussion assumes that the long and short positions in a merger arbitrage transaction are acquired prior to shareholder approval.

A constructive sale should not occur in the less typical situation where the arbitrageur buys the stock of the acquirer and sells short the stock of the target. Assuming that the long position in the acquirer's stock is the appreciated financial position, Code section 1259(c)(1)(A) should not apply because (a) the stock of the target is not "substantially identical" to the stock of the acquirer at the time of the short sale, and (b) the arbitrageur should not be treated as entering into a short sale of the stock of the acquirer as a consequence of the merger. Assuming the arbitrageur's short position in the target is the appreciated financial position, Code section 1259(c)(1)(D) should not apply because, if the acquisition is completed, the arbitrageur will not "acquire" any stock that is the "same or substantially identical" to the target's stock.

The applicability of the constructive sale rule is somewhat less clear when the arbitrageur buys the stock of the target and sells short the acquirer's stock. A constructive sale should not occur under either Code section 1259(c)(1)(A) or (D) at the time the arbitrageur enters into the long and short positions because the stocks of the acquirer and the target are not "substantially identical" at that time. Further, even if the acquisition is completed and the arbitrageur receives shares in the acquirer in exchange for the shares of the target, no constructive sale should occur if the long position in the target stock represents the appreciated financial position and the short position in the acquirer's stock has not appreciated (i.e., the current market price of the acquirer's stock exceeds the sales price received by the arbitrageur on the short sale of such stock). Because the short sale does not constitute an appreciated financial position, Code section 1259(c)(1)(D) does not apply in this situation.

However, if the short position in the stock of the acquirer represents the appreciated financial position, the issue arises whether Code section 1259(c)(1)(D) will apply when the arbitrageur receives stock in the acquirer upon completion of the acquisition pursuant to a tax-free transaction, including a stock merger, a stock-for-stock exchange, or an asset acquisition in exchange solely for voting stock of the acquirer. As noted above, a constructive sale will occur if the arbitrageur is treated as having "acquire[d]" the acquirer's stock within the meaning of Code section 1259(c)(1)(D).

No published authority or direct legislative history provides definitive guidance as to when a taxpayer will be treated as having "acquired" stock "substantially identical" to that sold short for purposes of Code section 1259(c)(1)(D). In the absence of any direct authority, and based on a published Revenue Ruling and a 1984 IRS General Counsel memorandum, many tax practitioners take the view that an arbitrageur's receipt of the acquirer's stock in exchange for its target stock pursuant to a tax-free acquisition does not constitute an acquisition for purposes of Code section 1259(c)(1)(D).

In *Revenue Ruling* 62-153 [1962-2 C.B. 186], the IRS ruled that a taxpayer will not be treated as having "acquired" common stock for purposes of the short sale rules when the taxpayer receives common stock pursuant to a nontaxable conversion of convertible preferred stock of the same corporation.[14] In General Counsel Memorandum 39304 [Nov. 5, 1984], the IRS relied on the holding in *Revenue Ruling* 62-153 to conclude that the word "acquired" within the meaning of Code section 1233(b) means an acquisition by a purchase or taxable exchange, and does not include a taxpayer's receipt of stock pursuant to a nontaxable exchange (including a stock-for-stock exchange as part of a tax-free reorganization).[15] Based upon this authority, adoption of this definition of the word "acquired" for purposes of Code section 1259(c)(1)(D) is clearly supportable in the absence of any direct authority interpreting the scope of the transactions to be covered by this statutory provision.

CONVERTIBLE DEBT SECURITIES

Convertible arbitrage typically involves purchasing a convertible debt security and selling short the stock into which the debt security is convertible. There are no specific provisions of the Code that govern the federal income tax consequences of owning or converting a convertible debt security. These tax consequences are determined pursuant to various statutory provisions, Treasury regulations, judicial authorities, and IRS pronouncements. The discussion below assumes that a particular convertible debt security is properly characterized for tax purposes as indebtedness of the issuer, rather than an equity interest in the issuer.

Acquisition

A taxpayer who acquires a debt security convertible into the stock of the corporate issuer via a taxable transaction (e.g., a purchase on the market or from a third party) will have a tax basis in the security equal to its cost [Code sec. 1012]. In this event, the taxpayer's holding period for the security will commence on the date of acquisition.

When the taxpayer acquires a convertible debt security in a nontaxable exchange (e.g., as the result of an exchange pursuant to a tax-free reorganization), the taxpayer's basis in the security is generally the same as the basis the taxpayer had in the property exchanged for the security [Code sec. 358]. In this event, the taxpayer's holding period in the exchanged security is "tacked on" to the taxpayer's holding period in the convertible debt security (i.e., the taxpayer's holding period in the convertible security is added to its holding period in the exchanged security) [Code sec. 1223(1)].

A convertible debt security would constitute a capital asset for a taxpayer treated as a trader or an investor for federal income tax purposes, so any gain or loss derived from the sale or exchange of the security would be treated as a capital gain or loss. As with other capital assets, the resulting capital gain or loss would be characterized as long term or short term depending on whether the taxpayer had a holding period in the security of more than one year on the date of the sale or exchange [Code secs. 1221 and 1222].

When the debt security is convertible into either the stock of the issuer or the stock or debt of a related party, the conversion feature is not treated as a separate asset, and no portion of the purchase price is allocated to this feature [Treas. Reg. §1.1272-1(e)].[16] However, if the debt security is convertible into the stock of an entity other than the issuer (e.g., the parent company of the issuer), then the security's purchase price must be allocated between the debt security and the conversion feature, based on their relative fair market values [Code sec. 1273(c)(2)]. As a result, the debt security will generally be treated as having "original issue discount," which will be included in the holder's income over the term of the security on an economic accrual basis [Code sec. 1272(a)(1)].

If a convertible debt security is acquired at a premium over its face amount (i.e., the purchase price for the security exceeds the principal amount payable upon maturity of the security), the taxpayer is not entitled to deduct currently the premium attributable to the conversion [Code sec. 171(b)]. However, if the taxpayer has control over whether or not to convert the security, any premium paid in excess of the amount attributable to the conversion feature can be amortized (at the election of the taxpayer) as a deduction over the term of the security (calculated under a constant yield method under Code section 171).

In applying these rules, the value of the conversion feature is determined at the time the security is acquired by estimating the price the taxpayer would have paid for the security if it had not had the conversion feature. This is done by (a) determining the yield on nonconvertible debt securities with similar characteristics, and (b) determining the price currently paid for a security of the specified yield, classification, and grade, using standard bond tables [Treas. Reg. §1.171-2(c)(2)].

If the taxpayer elects to take amortization deductions with respect to a premium and subsequently converts the debt security before the premium is fully amortized, the taxpayer is not entitled to deduct currently the amount of the unamortized premium. Rather, this amount is treated as part of the cost basis of the stock acquired upon conversion. The taxpayer's tax basis in the new security is the same as that of the converted debt. [See *Ades v. Commissioner*, 38 T.C. 501, 512 (1962), *aff'd per curiam*, 316 F.2d 734 (2d Cir. 1963).]

Change in Conversion Ratio or Prices

In general, a stock dividend (or a series of distributions) is taxable if some shareholders receive cash or other property while other shareholders receive an increase in their proportionate interest in the assets or earnings and profits of the corporation [Code sec. 305(b)(2)]. A change in either the conversion ratio or the conversion price of a convertible debt security can, under certain circumstances, be deemed a distribution of property by the corporate issuer to those security owners who are treated as having increased their proportionate ownership interests in the issuer by reason of the deemed distribution [Code sec. 305(c)]. In determining whether any shareholder's proportionate interest has increased, the outstanding stock of the corporation is assumed to include securities that are convertible into the stock, whether or not a conversion actually occurs during the taxable year [Treas. Reg. §1.305-3(b)(5)]. Unless the convertible debt securities provide for a "full adjustment" in the conversion ratio or conversion price to reflect all stock dividends payable by the corporation, the payment of interest on the convertible debt securities appears to result in the taxability of the stock dividends.

The IRS has ruled that an increase in the conversion ratio of convertible debt securities is a deemed distribution to the owners of the securities if the conversion ratio is adjusted each year to reflect the differential between the interest rate on the securities and the yield that could have been obtained by investing in the corporation's stock on the date the convertible debt securities were issued [*Revenue Ruling* 75-513, 1975-2 C.B. 114]. In the case that was the subject of this ruling, the corporation paid a cash dividend to its shareholders and adjusted the conversion ratio of its convertible debt securities to entitle the owners of these securities to acquire additional shares of stock upon conversion. The IRS held that the cash dividend resulted in a deemed distribution to the owners of the convertible debt securities because these owners experienced a disproportionate increase in their interest in the corporation by reason of the change in conversion ratio.

Conversion into Stock

A taxpayer does not generally recognize a gain or loss when a convertible debt security is exchanged for stock in the corporation that issued the security, provided the conversion rights are contained in the terms of the debt security [*Revenue Ruling* 72-265, 1972-1 C.B. 222 and *Rose v. Trust Co. of Ga.*, 77 F.2d 355, 356 (5^{th} Cir. 1935)]. The taxpayer's basis in the stock received upon conversion is the same as the taxpayer's basis in the convertible debt security [*Revenue Ruling* 72-265, *supra*].

Under most circumstances, a taxpayer will recognize a gain or loss when a convertible debt security is converted into the common stock of a corporation separate and distinct from the issuer of the security [*Revenue Ruling* 69-135, 1969-1 C.B. 198, distinguished by *Revenue Ruling* 79-155, 1979-1 C.B. 153]. In this event, the amount of the taxable gain or loss will equal the difference between the fair market value of the common stock received on the conversion and the taxpayer's basis in the converted debt security. However, the IRS has ruled that no gain or loss is recognized when a convertible debt security is converted into the stock of the issuer's parent corporation pursuant to a tax-free statutory merger in which the acquiring corporation and the parent were both liable for convertible securities acquired in the merger and the securities' interest rates and maturity dates would change [*Revenue Ruling* 79-155, *supra*].

NOTIONAL PRINCIPAL CONTRACTS

"Notional principal contracts" (e.g., swaps, caps and floors) permit parties to reduce the cost of debt, enhance the yield on assets, and manage interest rate exposure in a variety of circumstances. For many years, there were no statutory or regulatory provisions directly relating to the proper tax characterization of notional principal contracts (NPCs)—that is, whether they constituted debt instruments or a series of cash-settled forward contracts or options—or to the timing, characterization (i.e., capital or ordinary), and source of payments made under them. Treasury regulations issued in 1993 and various IRS pronouncements now provide guidance on a number of these key tax issues, although, as discussed below, some important tax aspects of NPCs still remain uncertain.

The definition of an NPC for tax purposes, and the rules governing the timing of income and deductions on NPCs, are contained in Treasury regulations issued under Code section 446 (the "NPC Regulations") [Treas. Reg. §1.446-3]. Except in the case of certain "embedded loans" (as discussed below in connection with "nonperiodic payments"), the NPC Regulations treat an NPC as a single unitary instrument for tax purposes.

For tax purposes, an NPC is defined as a financial instrument that provides for payments between one party and another party at specified intervals over the life of the contract, where one party pays an amount calculated by applying a rate determined by reference to a "specified index" to a "notional principal amount" and the other party pays a similar amount or an amount specified in the terms of the instrument [Treas. Reg. §1.446-3(c)(1)(i)].[17] The term "specified index" is defined to include (a) a fixed rate, price, or amount (i.e., a fixed index); (b) a fixed index that applies in one or more specified periods, followed by one or more different fixed indices that apply in other periods; (c) an index based on "objective financial information";[18] or (d) an interest rate index that is regularly used in normal lending transactions between a party to the contract and unrelated parties [Treas. Reg. §1.446-3(c)(2)(iv)].

The term "notional principal amount" means any specified amount of money or property that, when multiplied by a specified index, measures a counterparty's rights and obligations under the contract; it does not represent an amount that is actually borrowed or loaned between the counterparties as part of the contract. The notional principal amount may vary over the term of the contract, provided that the variation is set in advance or is based on objective financial information [Treas. Reg. §1.446-3(c)(3)].

The NPC Regulations expressly provide that interest rate swaps, currency swaps, basis swaps, interest rate caps, interest rate floors, commodity swaps, equity swaps, equity index swaps, and similar agreements all qualify as NPCs. A collar is not itself an NPC, but certain caps and floors that comprise a collar may be treated as a single NPC under special rules. A contract may be an NPC even though its term is subject to termination or extension. Further, each confirmation under a master agreement to enter into agreements governed by the NPC Regulations is treated as a separate NPC [Treas. Reg. §1.446-3(c)(1)(i)].

The NPC Regulations expressly exclude the following contracts from NPC status: any “section 1256 contract,” futures contracts, forward contracts, and options.[19] Further, an instrument or contract that constitutes indebtedness under general income tax principles or an option or forward contract that entitles or obligates a person to enter into an NPC (e.g., a swaption) does not constitute an NPC [Treas. Reg. §1.446-3(c)(1)(ii)].[20]

Timing and Measurement of Income

The stated purpose of the NPC Regulations is to ensure the clear reflection of the income and deductions from NPCs by “prescribing accounting methods that reflect the economic substance of such contracts” [Treas. Reg. §1.446-3(b)].[21] For all federal income tax purposes, the net income or net deduction from an NPC for a taxable year is included in or deducted from gross income for that year.[22] The net income or net deduction for a taxable year equals the ratable daily portion of all of the “periodic payments” and “nonperiodic payments” recognized from the NPC for that year.

Periodic Payments. Periodic payments are defined as payments made or received pursuant to an NPC that are payable at intervals of one year or less during the entire term of the NPC (including any extension periods provided for in the NPC), if they are based on (a) a specified index (appropriately adjusted for the length of the interval), and (b) either a single notional principal amount or a notional principal amount that varies over the term of the NPC in the same proportion as the notional principal amount that measures the other counterparty’s payments [Treas. Reg. §1.446-3(e)(1)]. Under this definition, periodic payments would include payments made or received pursuant to a standard swap contract and payments under a cap or floor that arise because the strike price has been exceeded or not met, as the case may be. However, payments to purchase or sell a cap or floor do not constitute periodic payments [Treas. Reg. §1.446-3(e)(1)].

A swap with “significant” nonperiodic payments is treated as two separate transactions—an “on-market level payment” swap and a loan between the counterparties. The loan must be accounted for independently of the swap, with the time-value component of the loan being treated as interest for all purposes of the Code, rather than as net income or net deductions from the swap [Treas. Reg. §1.446-3(g)(4)].[23]

The NPC Regulations provide that all taxpayers, regardless of their regular method of accounting, must recognize the ratable daily portion of a periodic payment in the taxable year to which that portion relates (i.e., the amount accruable for a given period is divided by the number of days during the period and multiplied by the number of days the NPC was held by the taxpayer during the taxable year). Accordingly, a periodic payment that relates to a period that covers two taxable years would be ratably allocated between those two years [Treas. Reg. §1.446-3(e)(2)(i)].

The terms of an NPC may provide that payments with respect to one taxable year are dependent on a specified index value that is fixed at some time beyond that year. In this case, the ratable daily portion of the periodic payment relating to that year is generally determined as though the value of the specified index as of the last day of the taxable year were the fixed value. If the taxpayer determines that the value of the specified index as of the last day of the taxable year does not provide a reasonable estimate of the specified index that will apply when the payment is fixed, the taxpayer may use a reasonable estimate of the specified index on a consistent basis [Treas. Reg. §1.446-3(e)(2)(ii)].[24] When the specified index value subsequently becomes fixed in the next year, the difference between the estimate that was recognized and the corresponding portion of the actual payment that became fixed is taken into account as an adjustment to the net income or net deduction from the NPC in the subsequent year [Treas. Reg. §§1.446-3(e)(2)(ii) and (iii)].

Nonperiodic Payments. A nonperiodic payment is defined, by default, as any payment made or received with respect to an NPC that is neither a periodic payment nor a "termination payment" (as discussed below). Examples of nonperiodic payments are the premium for a cap or floor agreement (even if it is paid in installments), the yield adjustment fee paid for an off-market swap agreement (i.e., the present value of a stream of periodic payments to be made in the future), the prepayment of part or all of one leg of a swap, and the premium for an option to enter into an NPC (if and when the option is exercised) [Treas. Reg. §1.446-3(f)(1)].

Under the NPC Regulations, all taxpayers, regardless of their regular method of accounting, must recognize the ratable daily portion of a nonperiodic payment in the taxable year to which it relates. In general, a nonperiodic payment must be amortized and recognized over the term of the NPC in a manner that reflects the economic substance of the NPC [Treas. Reg. §1.446-3(f)(2)(i)]. When the term of an NPC is subject to extension or termination, the nonperiodic payment is amortized over the reasonably expected term of the NPC [Treas. Reg. §1.446-3(f)(3)].

To determine the taxable year to which any portion of a nonperiodic payment relates, the NPC Regulations provide (a) a general rule applicable to nonperiodic swap payments; (b) a general rule applicable to premiums paid with respect to cap or floor contracts; and (c) alternative methods applicable to both yield adjustment fees and cap/floor premiums. The two general rules reflect the substantially different bases on which such nonperiodic payments are calculated and amortized.

Swaps. A nonperiodic payment that relates to a swap must generally be recognized over the term of the swap contract by allocating the payment in accordance with the forward rates (or, in the case of a commodity, the forward prices) of a series of cash-settled forward contracts that reflect the specified index and the notional principal amount. The forward rates used to determine the amount of the payment will be respected by the IRS if they are reasonable [Treas. Reg. §1.446-3(f)(2)(ii)]. NPC dealers must use this allocation method [Treas. Reg. §1.446-3(f)(2)(iii)].[25] Other swap participants may elect alternative methods.

For example, in the case of a prepaid swap where an upfront payment is made, a swap participant other than a dealer can elect to use the "level payment method" for purposes of determining the timing of income and deductions. The upfront payment may be amortized by assuming that the payment represents the present value of a series of equal payments made throughout the term of the swap contract. The discount rate used in this present value calculation must be the rate or rates used by the counterparties in determining the amount of the nonperiodic payment. If that rate is not readily ascertainable, the discount rate used must be a rate that is reasonable under the circumstances. Each equal payment is separated into a principal-recovery and a time-value component. The principal-recovery components are treated as periodic payments made on the payment dates specified in the swap contract.[26] The time-value component is used only to compute the amortization of the nonperiodic payment and is otherwise disregarded [Treas. Reg. §1.446-3(f)(2)(iii)(A)].

A nonperiodic payment that is not made at the start of a swap contract may be amortized over the term of the swap by treating the contract as if it provided for (a) a single upfront payment equal to the present value of the nonperiodic payment, and (b) a loan between the counterparties. (The discount rate used to determine the deemed upfront payment and the time-value component of the deemed loan is the rate used by the counterparties to determine the amount of the nonperiodic payment.) The single upfront payment is then amortized according to the level payment method described above. The time-value component is added to the amortized amount of each deemed upfront payment, and the total is recognized as a periodic payment for the period [Treas. Reg. §1.446-3(f)(2)(iii)(B)].[27]

Caps and Floors. The NPC Regulations provide a general rule for the amortization of premiums paid for caps and floors. Under this general rule, a payment made to purchase or sell a cap or floor must be recognized over the term of the agreement by allocating it in accordance with the prices of a series of cash-settled option contracts that reflect the specified index and the notional principal amount. Any reasonable option pricing formula used by the counterparties to determine the total amount paid for the cap or floor will be respected [Treas. Reg. §1.446-3(f)(2)(iv)].[28] Only that portion of the purchase price that is allocable to the option contract or contracts that expire during a particular period is recognized for that period. Accordingly, straight-line or accelerated amortization of a cap premium is generally not permitted [Treas. Reg. §1.446-3(f)(2)(iv)].

The general rule must be used by a counterparty that is a dealer in NPCs and enters into a cap or floor in its capacity as a dealer. Taxpayers that enter into cap or floor contracts primarily to reduce risk with respect to specific debt instruments or groups of debt instruments they hold or have issued can elect an alternative method.

For caps and floors that hedge debt instruments, the NPC Regulations provide several alternative amortization methods that may be used for purposes of determining the timing of income and deductions [Treas. Reg. §1.446-3(f)(2)(v)].[29] Thus, a premium paid upfront for a cap or a floor may be amortized using the level payment method described above (i.e., by treating the payment as representing the present value of a series of level payments to be made at the end of each of the periods to which the cap/floor applies) [Treas. Reg. §§1.446-3(f)(2)(v)(A) and (f)(2)(iii)(A)]. A nonperiodic payment on a cap or floor other than an upfront payment (e.g., where the cap or floor premium is paid in installments) may be amortized by treating the contract as if it provided for an upfront payment equal to the present value of the nonperiodic payment and a loan between the counterparties. As a result, a cap or floor premium paid in level annual installments over the term of the contract is taken into account in accordance with the level payment method [Treas. Reg. §1.446-3(f)(2)(v)(B)].[30]

Under the NPC Regulations, a taxpayer may also treat a cap and a floor that comprise a collar as a single NPC and may amortize the net nonperiodic payment to enter into the cap and floor over the term of the collar, in accordance with the other methods that apply to caps and floors. Thus, in the case of a zero-cost collar, the premium paid would offset the premium received, and there would be no net nonperiodic payment to amortize [Treas. Reg. §1.446-3(f)(2)(v)(C)].

Termination Payments

The NPC Regulations provide specific rules for dealing with "termination payments," which are defined as payments made or received to extinguish or assign all or a part of the remaining rights and obligations of any party under an NPC. A termination payment includes (a) a payment made between the original parties to the NPC (an "extinguishment"), (b) a payment made between one party to the contract and a third party (an "assignment"), and (c) any gain or loss realized on the exchange of one NPC for another [Treas. Reg. §1.446-3(h)(1)]. Further, any economic benefit that is given to or received by a taxpayer in lieu of a termination payment is also treated as such a payment [Treas. Reg. §1.446-3(h)(4)(ii)].

A payment is not a termination payment if it is made or received by a party in exchange for assigning all or a portion of one leg of an NPC at a time when a substantially proportionate amount of the other leg remains unperformed or unassigned. Such a payment, depending on the economic substance of the transaction to each party, is either (a) an amount loaned or borrowed, or (b) a nonperiodic payment. This characterization applies regardless of whether the original NPC is terminated as a result of the assignment [Treas. Reg. §1.446-3(h)(4)(i)].

When one party assigns its remaining rights and obligations to a third party, the original nonassigning counterparty realizes a gain or loss provided the assignment results in a "deemed exchange" of contracts and a realization event under Code section 1001 [Treas. Reg. §1.446-3(h)(1)]. While the NPC Regulations do not themselves address what may constitute a "deemed exchange" for this purpose, other Treasury regulations provide that a deemed exchange does not occur if (a) the party assigning its rights and obligations under the NPC and the party to whom the rights and obligations are assigned are both dealers in NPCs, and (b) the terms of the NPC permit the substitution [Treas. Reg. §1.1001-4(a)].

Subject to certain limited exceptions (e.g., installment sales and straddles), a counterparty must recognize a termination payment in the year in which the contract is extinguished, assigned, or exchanged [Treas. Reg. §1.446-3(h)(2)]. In addition, when the termination is recognized, the party making or receiving such payment also recognizes any other payments that have been made or received pursuant to the NPC, but that have not been recognized (e.g., unamortized nonperiodic payments). If only part of a counterparty's rights and obligations is extinguished or assigned, this rule applies only to a proportionate part of such unrecognized payment.

The assignee of a position in an NPC recognizes any termination payment made or received under the rules relating to nonperiodic payments. The termination payment must therefore be amortized over the remaining term of the NPC or, if the facts so require, taken into account under the provisions relating to significant nonperiodic payments [Treas. Reg. §1.446-3(h)(3)].

Contingent Final Payments

The NPC Regulations reserve discussion on the taxation of contingent payments made upon the maturity of NPCs (i.e., payments that are not fixed in amount at the inception of the NPC). It is not currently clear whether such contingent final payments constitute nonperiodic payments or termination payments for purposes of the NPC Regulations.[31] Regardless of the classification of such payments, both cash-basis and accrual method taxpayers generally have taken the position that a contingent final payment under an NPC is not taxable to the recipient until the taxable year in which the amount of such payment is paid or is determinable with reasonable accuracy, as the case may be.[32]

In 2001, the IRS announced that it is in the process of evaluating four alternative methods of taxing contingent payments under NPCs and invited comments from the public on the appropriate method for the inclusion into income or deduction of contingent payments and the treatment of such inclusions or deductions. Each of these alternatives involves to some degree an attempt by the IRS to match the timing of the taxation of a contingent final payment to the recipient with the deductibility of the payment by the counterparty.[33]

Character of Payments Made Under an NPC

The NPC Regulations do not specifically address whether payments made pursuant to an NPC produce ordinary income and deductions or capital gains and losses. It is clear that NPC payments do not generally constitute interest for federal income tax purposes.[34] Furthermore, NPCs that are properly identified as hedges under the Treasury regulations concerning hedging transactions [Treas. Reg. §1.1221-2(a)(1)] and payments with respect to NPCs held by dealers for purposes other than investment would clearly produce ordinary income.

While there is no published authority directly on point, both periodic payments and nonperiodic payments should result in ordinary income or loss, rather than capital gain or loss.[35] This is because (a) a capital gain or loss results from the "sale or exchange" of a capital asset, and (b) payments made pursuant to the terms of an NPC generally do not constitute a "sale or exchange."[36]

Taxpayers have asserted that periodic payments could be treated as capital gains or losses on the theory that each periodic payment constitutes either a partial termination of the NPC or a complete termination of separate bifurcated NPCs. However, the IRS rejected this assertion in

Technical Advice Memorandum 9730007 concerning periodic payments under a commodity swap. In concluding that the periodic payments constituted ordinary income or expense, the IRS rejected the taxpayer's arguments that a swap was economically identical to a series of cash-settled forward contracts and that the periodic payments were made or received to close each separate forward contract. The IRS concluded that, while an NPC is economically similar to a series of cash-settled forward contracts, it is a single indivisible financial instrument.

Significantly, this Technical Advice Memorandum did not discuss the tax characterization of nonperiodic payments. However, the analysis in this memorandum indicates that the IRS would also treat nonperiodic payments, or any payments made pursuant to the terms of an NPC, as ordinary income or loss. When an NPC constitutes a capital asset to a taxpayer, Code section 1234A provides that a capital gain or loss results from the cancellation, lapse, expiration, "or other termination" of a right or obligation with respect to such asset.[37] Accordingly, termination payments with respect to such an NPC should constitute capital gains or losses to the recipient under this statutory provision.

However, there is little guidance as to whether a particular payment should be treated as a cancellation, lapse, expiration, or other termination of a right or obligation. For example, should Code section 1234A apply to a contingent payment made at the maturity of an NPC (e.g., a payment made at the end of an equity swap that reflects price movement in the underlying equity over the term of the swap)? While the IRS took the position in Technical Advice Memorandum 9730007 that Code section 1234A does not apply to payments made pursuant to the terms of an NPC, the terms of NPCs providing for contingent final payments are factually distinguishable from the NPC analyzed in that Technical Advice Memorandum, and many tax practitioners take the position under the current rules that Code 1234A provides capital gains treatment for contingent final payments.

OPTIONS

The federal income tax treatment of option transactions is governed by a number of statutory provisions (e.g., Code sections 1234, 1234A, and 1256) and related pronouncements by the IRS. As discussed more fully below, the tax rules applicable to a particular option transaction depend largely on (a) whether the transaction is a capital transaction with respect to each party or is entered into by option dealers in the course of their trade or business as market makers or specialists; (b) whether the option is treated as listed or unlisted; and (c) the nature of the property underlying the option (e.g., stock, stock indices, foreign currencies, bonds).

For federal income tax purposes, options are characterized as "listed options" or "unlisted options" and as "equity options" or "nonequity options." A "listed option" is any option other than a warrant to acquire stock from the issuer that is traded on, or subject to the rules of, a "qualified board or exchange." For this purpose, a "qualified board or exchange" is defined as: (a) a national securities exchange registered with the Securities and Exchange Commission (SEC), (b) a domestic board of trade that has been designated as a contract market by the Commodity Futures Trading Commission (CFTC), or (c) another exchange, board of trade, or market designated by the Treasury Department. All other options (i.e., options traded over the counter) are treated as "unlisted options" [Code secs. 1256(g)(5) and (g)(7)].

An option is an "equity option" (whether or not listed) if it entitles the holder to buy or sell stocks, or if its value depends directly or indirectly on any stock, group of stocks or stock index, provided that (a) the CFTC has not designated a contract market for trading an option based on the group of stocks, or stock index, and (b) the Treasury Department has not determined that the requirements for CFTC designation have been met [Code sec. 1256(g)(6)]. Thus, any option on a single stock, such as an option on General Motors stock trading on the Chicago Board of Trade, is an equity option. A cash-settled option based on a narrow group of stocks will probably be an equity option because it will likely not meet the requirements for a designation of a contract market by the CFTC.[38]

Any listed equity option that is purchased or granted by an "options dealer" in the normal course of its activity in dealing in options and also listed on the board or exchange on which the dealer is registered constitutes a "dealer equity option" [Code sec. 1256(g)(4)]. An "options dealer" is defined as any person registered with an appropriate national securities exchange as a market maker or specialist in listed options, or any person who performs similar functions, as determined by the IRS pursuant to Treasury regulations [Code sec. 1256(g)(8)]. An equity option entered into by a dealer for investment purposes, however, does not constitute a dealer equity option [Code sec. 1256(g)(3)].

A nonequity option is any listed option that does not qualify as an equity option [Code Sec. 1256(g)(3)]. Thus, listed options on commodities and foreign currencies and options on futures contracts are nonequity options. Any option traded on a national securities exchange (or other market designated by the Treasury Department) whose value is determined directly or indirectly by reference to a group of stocks or a stock index is also a nonequity option if (a) the CFTC has designated a market for a contract based on the group of stocks or stock index, or (b) the Treasury Department has determined that the option otherwise meets the legal requirements for such a designation [Code sec. 1256(g)(6)(B)].

The IRS has ruled that options based on a stock index that are traded on (or subject to the rules of) a qualified board of exchange meet the requirements for contract designation and are nonequity options if (a) the options provide for cash settlement, and (b) the SEC has determined that the underlying stock index is a "broad-based" index. Warrants based on a stock index that are substantively identical in all material economic respects to options based on a stock index are treated as nonequity options [*Revenue Ruling* 94-63, 1994-2 C.B. 188].

Listed nonequity options and dealer equity options qualify as "Section 1256 contracts" and are subject to the special taxation rules provided in Code section 1256.[39] Unlisted nonequity options and equity options held by nondealers (e.g., traders or investors) are generally subject to the tax rules provided in Code section 1234.[40]

The following discussion assumes that Code section 1234 applies to the transaction and that the property underlying the option is a capital asset in the hands of the holder. It thus applies to put and call options (whether listed or unlisted) on individual stocks, since they constitute equity options [Code sec. 1256(b)] that are capital assets in the hands of an investor [Code sec. 1234(a) and Treas. Reg. §1.234-1(a)]. The taxation of listed nonequity options and dealer equity options is discussed in the section entitled "Section 1256 Contracts."

Tax Treatment for Option Holders

The premium paid by a holder to purchase an option and any related transactional costs (e.g., fees or commissions paid) represent the costs of the option and constitute nondeductible capital expenditures that are added to the holder's basis in the option [*Revenue Ruling* 78-182, 1978-1 C.B. 265 and *Revenue Ruling* 58-234, 1958-1 C.B. 279]. These costs are taken into account upon a subsequent sale, exchange, lapse, or other termination of the option.

Depending on the holder's other investments, the purchase of a put may trigger any of several provisions that can affect the holding period or tax treatment of the put and the other investments. For example, certain combinations of options and offsetting positions that have the effect of reducing the holder's risk of loss and opportunity for gain can trigger the constructive sale rules under Code section 1259 (discussed above in the section entitled "Short Sales"). In addition, because the purchase of a put is treated in the same manner as a short sale [Code sec. 1233(b)], the purchase may result in the creation of a tax "straddle," which, as discussed below, can have adverse consequences for the tax treatment of the stock underlying the put option.[41] Purchase of an option can also trigger the "wash sales" rules if it occurs within the 30-day period surrounding the sale of "substantially identical" securities [Code section 1091(a)].[42]

Upon the sale, exchange, or other disposition of an option, the option holder will recognize a gain or loss equal to the difference between the premium paid in the opening transaction and the net proceeds received upon such disposition, after adjustment for commissions and other expenses of sale. The character of this gain or loss is determined by the character of the underlying property [Code sec. 1234(a) and Treas. Reg. §1.1234-1(a)]. Capital gain or loss will result if the underlying property is a capital asset in the hands of the holder. The investor's holding period in the option on the date of its disposition will determine whether this capital gain or loss is long term or short term [Treas. Reg. §1.1234-1(a) and *Revenue Ruling* 78-182, *supra*].

If the option holder allows the option to expire or lapse unexercised, the option is deemed to be sold or exchanged on the date of expiration or lapse [Code sec. 1234(a)(2) and Treas. Reg. §1.1234-1(b)]. The holder can then deduct its tax basis in the option (i.e., the premium and any transaction costs paid to acquire the option) as a capital loss. The holder's period in the option will determine whether this capital loss is long term or short term [*Revenue Ruling* 78-182, *supra*].

When the option holder exercises a call option, the basis of the stock acquired is equal to the sum of the exercise price and the holder's tax basis in the option [*Revenue Ruling* 78-182, *supra*]. The holding period in the acquired stock begins on the day after exercise of the option [*Revenue Ruling* 88-31, 1988-1 C.B. 302 and *Revenue Ruling* 70-598, 1970-2 C.B. 168]. When the holder exercises a put option, the option's tax basis is deducted from the amount received from the option writer in determining the holder's gain or loss from the transaction. Assuming the property sold pursuant to the exercise of the put is a capital asset to the holder, the holder will recognize a capital gain or loss on the sale. The holding period in the property will determine whether this capital gain or loss is long term or short term.

Option Writers

The option writer does not recognize any income upon receipt of a premium for writing an option, regardless of whether the option is listed or unlisted [*Revenue Ruling* 78-182, *supra*] or whether the premium is paid at once or over a period of time [*Koch v. Commissioner*, 67 T.C. 71

(1976) *acq.*, 1980-2 C.B.1]. Instead, the option writer carries the premium in a deferred account until the option is exercised, sold, or lapses, or until the writer's obligations under the option are terminated in a closing transaction [*Revenue Ruling* 78-182, *supra*]. Any commissions or fees paid by the option writer in connection with writing the option are deducted from the premium received [*Revenue Ruling* 58-234, *supra*].

An option writer who does not grant options in the ordinary course of a trade or business recognizes a short-term capital gain when the option lapses or expires without being exercised by the holder [Code sec. 1234(b)(1)]. The amount of the gain equals the net premium received by the option writer in the opening transaction.

When a listed or unlisted call option is exercised by the holder and the option writer is required to sell the underlying stock, the net premium received for writing the option is added to the amount realized on the sale of the stock. Any resulting gain or loss is treated as a long-term or short-term capital gain or loss depending on the option writer's holding period in the property, regardless of the time the call option was outstanding.

When the writer of a put option purchases stock pursuant to the holder's exercise of the option, the net premium received for writing the option decreases the writer's tax basis in the purchased stock [*Revenue Ruling* 78-182, *supra*]. Further, the holding period for the purchased stock begins on the date after the purchase and not on the date the put was written [*Revenue Ruling* 78-182, *supra*].

The writer of a listed or unlisted option that repurchases the option from the holder will recognize a short-term capital gain or loss to the extent of the difference between the premium paid to repurchase the option and the premium originally received [Code sec. 1234(b)(1)].

Securities Futures Contracts

A "securities futures contract" (SFC) is a contract for future delivery of a single security or a "narrow-based security index," including any related interest [Code sec. 1234B(c) and Section 3(a)(55)(A) of the Securities Exchange Act of 1934]. The following summarizes the principal federal tax consequences of the purchase and sale of SFCs by taxpayers other than "dealers" in SFCs.[43]

The timing of the recognition of gains and losses on SFCs is generally similar to that for single stock equity options under Code section 1234. Merely entering into an SFC does not usually trigger a taxable event. Rather, a gain or loss will be recognized upon the sale, exchange, or termination of the SFC. The general rule governing the character of any gain or loss is also comparable to that governing single stock options. Subject to certain specified exceptions, the gain or loss is treated as having the same character as the property to which the SFC relates [Code sec. 1234B(a)(1)]. Accordingly, the gain or loss recognized by a market neutral trader or investor would be treated as a capital gain or loss. However, ordinary income or loss results from the sale, exchange, or termination of SFCs that constitute inventory or "hedging transactions," or from a contract that would otherwise give rise to ordinary income [Code sec. 1234B(a)(2)].

A taxpayer that has entered into an SFC to buy a security closes out its position in the contract in one of three ways: (a) offsetting its position through entering into an identical SFC to sell the security; (b) settling the SFC in cash on the contract maturity date; or (c) taking delivery of the underlying security. The taxpayer in (a) or (b) will recognize a capital gain or loss, which will be long term or short term in nature according to the taxpayer's holding period in the SFC. A taxpayer that closes an SFC by taking delivery of the underlying security (situation (c) above) is treated as purchasing the security for the price specified in the SFC. In this event, the taxpayer's holding period in the stock is deemed to include the taxpayer's holding period in the SFC [H.R. Conf. Rep. No.106-1033 (Community Renewal Tax Relief Act of 2000)].

The general rules governing the timing, character, and holding period for SFCs to purchase securities also apply to SFCs to sell securities (a "short SFC"). Thus capital gain or loss will result on closing a short SFC relating to a security that is a capital asset to the taxpayer. The capital gain or loss is considered to be short term when the taxpayer purchases the underlying security on the open market within one year prior to the delivery date. A short SFC is generally treated as equivalent to a short sale of the underlying security; thus capital gain or loss from the sale or exchange of a short SFC is generally treated as short term, except to the extent provided by the tax rules applicable to "straddles" or under applicable Treasury regulations [Code sec. 1234B(b)].

A short SFC also constitutes a "futures or forward" contract within the meaning of the constructive sale rules contained in Code section 1259. Accordingly, subject to the short-term hedging exception contained in Code section 1259(c)(3), a constructive sale will occur when a taxpayer enters into a short SFC and holds or acquires securities "substantially identical" to the securities underlying the SFC.

Holding an SFC and selling short the securities underlying the SFC will result in the application of the special holding period rules relating to short sales [Code sec. 1233(e)(2)(D)]. Similarly, when a taxpayer enters into a short SFC while holding "substantially identical" securities, Code sections 1233(b) and (d) may apply to characterize certain capital gains and losses as short term.

SECTION 1256 CONTRACTS

Code section 1256 was enacted in 1981 as part of Congress's attempts to restrict abusive straddle transactions. As discussed below, this statutory provision conforms the taxation of "Section 1256 contracts" to the mark-to-market daily cash settlement used for futures contracts on domestic exchanges.

A "Section 1256 contract" is statutorily defined to include (a) regulated futures contracts, (b) foreign currency contracts, (c) nonequity options, (d) dealer equity options, and (e) any SFC entered into by a dealer [Code sec. 1256(b)]. Nonequity options and dealer equity options have been defined in the previous section relating to options.

A "regulated futures contract" (RFC) is a contract traded "on or subject to"[44] the rules of a qualified board of exchange (as defined earlier in the section on options), with respect to which the amount of payments made and received depends on a system of marking to market the value of the contract at the close of each trading day [Code sec. 1256(g)(1)]. Because all domestic futures contracts are traded on a domestic board of trade designated as a contract market by the CFTC and employing a mark-to-market system, all domestic futures contracts qualify as RFCs. The Treasury Department has determined that the following foreign futures exchanges constitute a qualified board or exchange for purposes of Code section 1256: the International Futures Exchange (Bermuda) Ltd. [*Revenue Ruling* 85-72, 1985-1 C.B. 286]; the Mercantile Division of the Montreal Exchange [*Revenue Ruling* 86-7, 1986-1 C.B. 295]; and the Singapore International Monetary Exchange Limited (provided its futures contracts are assumed by the Chicago Mercantile Exchange under the Mutual Offset System created between the two exchanges) [*Revenue Ruling* 87-43, 1987-1 C.B. 252].

For purposes of Code section 1256, a foreign currency contract is a contract that (a) requires delivery of, or is settled with respect to, the value of a foreign currency in which positions are also traded through RFCs (e.g., the Canadian dollar, British pound, Japanese yen); (b) is traded in the interbank market;[45] and (c) is entered into at arm's length at a price determined by reference to the price in the interbank market [Code sec. 1256(g)(2)(A)].[46] The Treasury Department has the statutory authority to prescribe regulations necessary or appropriate to carrying out the purposes of the definition of a foreign currency contract and to exclude any contract or type of contract from Code section 1256 if it is inconsistent with such purposes [Code sec. 1256(g)(2)(B)].

Taxation

Under Code section 1256, each Section 1256 contract that a taxpayer holds at the end of the year is treated as if it were sold for its fair market value on the last business day of the year and any resulting gain or loss is taken into account for that year [Code sec. 1256(a)(1)].[47] If the Section 1256 contract is a capital asset of the taxpayer, 60% of the gain or loss resulting from the deemed year-end sale is treated as a long-term capital gain or loss and 40% is treated as a short-term capital gain or loss, regardless of the actual time the taxpayer has held the Section 1256 contract [Code sec. 1256(a)(1)]. When a Section 1256 contract that has been marked to market is subsequently disposed of, the taxpayer adjusts any resulting gain or loss to reflect marked-to-market gains or losses previously recognized [Code sec. 1256(a)(2)]. If the Section 1256 contract is an ordinary asset of the taxpayer, the mark-to-market rule still applies, but any gain or loss is recognized as ordinary income or loss [Code secs. 1256(a)(3) and (f)(2)].

Under a special statutory rule, any gain or loss derived from the trading of Section 1256 contracts is treated as a capital gain or loss, provided the taxpayer does not hold the Section 1256 contract for the purpose of hedging property that would produce an ordinary loss if disposed of by the taxpayer [Code secs. 1256(f)(3)(A) and (B)]. Whether a taxpayer is actively engaged in dealing in or trading Section 1256 contracts is not taken into account for purposes of determining whether gain or loss realized is a capital gain or loss or ordinary income or loss [Code sec. 1256(f)(3)(C)].

In general, noncorporate taxpayers are not entitled to carry back net capital losses to offset capital gains derived in earlier taxable years, although they are permitted to carry these losses forward indefinitely [Code sec. 1212(b)]. Under a special rule, however, noncorporate taxpayers can elect to carry back any net capital losses from Section 1256 contracts to each of the three taxable years preceding the year in which the net capital loss was realized [Code sec. 1212(c)(1)(A)]. To the extent allowed, the carry back is treated as 60% long-term capital loss and 40% short-term capital loss [Code sec. 1212(c)(1)(B)]. The carried-back loss is permitted to offset only net capital gains that the taxpayer derived from Section 1256 contracts in the earlier taxable years and may not increase or produce a net operating loss [Code sec. 1212(c)(3)]. Under this special rule, any carried-back capital loss that is not fully utilized during the three-year carry-back period is carried forward to future taxable years under the general capital loss carry-forward rules [Code sec. 1212(c)(6)].[48]

The mark-to-market and 60/40 rules that apply to Section 1256 contracts held at the end of a taxable year also apply when the taxpayer's rights and obligations under a Section 1256 contract are terminated or transferred by offsetting, by taking or making delivery, by exercise or being exercised, by assignment or being assigned, or by lapse or otherwise [Code sec. 1256(c)(1)]. If such a termination or transfer occurs, the Section 1256 contract is treated as if it were sold for its fair market value and the gain or loss is taken into account by the taxpayer in the year of termination [Code sec. 1256(c)(3)].[49] The wash sale rules that generally apply to losses from the sale of stocks or securities do not apply to any loss arising from a Section 1256 contract [Code sec. 1256(f)].

STRADDLE RULES FOR STOCK

This section discusses the general applicability of the special tax rules on "straddles" to market neutral investment strategies involving equity investments. As indicated below, the application of the straddle rules where stock is involved is complex and, because of ambiguous statutory language, somewhat confusing.

This discussion assumes that a market neutral investor does not enter into any hedging transactions with respect to one or more of the stocks that it owns (e.g., the investor does not purchase put or call options or acquire other positions on the particular stocks that it owns). However, as discussed below, the straddle rules may apply when a market neutral investor acquires an option on an index that substantially overlaps with the stocks in its portfolio.

A "straddle" is defined for federal income tax purposes as "offsetting positions with respect to personal property" [Code sec. 1092(c)(1)]. Subject to certain special rules applicable to stock (which are discussed below), "personal property" generally means "any personal property of a type which is actively traded" (hereafter "actively traded property") [Code sec. 1092(d)(1)]. For purposes of the straddle rules, actively traded property includes any personal property for which there is an "established financial market" [Treas. Reg. §§1.1092(d)-1(a) and (b)(1)].[50] A "position" is defined to mean an "interest" (including a futures, forward contract, or option) in personal property [Code sec. 1092(d)(2)].

For purposes of the straddle rules, a taxpayer holds offsetting positions with respect to actively traded property if there is a "substantial diminution of the taxpayer's risk of loss" from holding any position because the taxpayer holds one or more other positions [Code sec. 1092(c)(2)(A)]. Risk reduction resulting merely from diversification is usually not considered to substantially diminish risk for purposes of the straddle rules as long as the positions are not balanced long and short. Therefore, a taxpayer holding several types of securities, but not holding any short positions, would generally not be considered to be holding offsetting positions ["1981 Bluebook" at 288]. The Code gives six rebuttable presumptions under which positions in personal property are presumed to be offsetting [Code secs. 1092(c)(2)(B) and (c)(3)]. Four presumptions apply to positions whose values ordinarily vary inversely with one another (i.e., the value of one position decreases while the other increases).[51]

When a position offsets only a portion of another position in actively traded property, the two positions should be treated as offsetting only to the extent of the portion that overlaps. The Treasury Department has the authority to issue regulations prescribing the method for determining the portion of a position that is to be treated as an offsetting position in these circumstances. To date, no such Treasury regulations have been issued.[52]

Special Rules for Stock

For purposes of the straddle rules, personal property does not generally include stock, although it may include an "interest" in stock, including actively traded contracts or options to buy or sell stock [Code sec. 1092(d)(3)(A)]. However, four statutory exceptions apply to stock and exchange-traded options acquired on or after January 1, 1984. Under the first three exceptions, stock *is* personal property when it is part of a straddle that includes (a) an option on the stock or on "substantially identical" securities; (b) a position in "substantially similar or related property (other than stock)"; or (c) an SFC to sell "substantially identical" stock [Code secs. 1092(d)(3)(B)(i)(I) and (III)]. Under the fourth exception, stock is personal property if it is the stock of a corporation formed or used to take positions in actively traded property that offset positions taken by any shareholder [Code sec. 1092(d)(3)(B)(ii)]. For purposes of these exceptions, stock is initially treated as personal property (i.e., one position of a straddle) in order to determine whether a second offsetting position is present [Code sec. 1092(d)(3)(C)(i)].

Under the first exception, a straddle exists if a taxpayer owns actively traded stock and a put option on that stock.[53] The straddle rules also apply when a taxpayer writes a call option on actively traded stock that it owns (i.e., a covered call option), unless the option constitutes a "qualified covered call option" (QCCO).[54] For purposes of this exception, the straddle rules apply to SFCs in the same manner that they apply to equity options, except the QCCO exception is inapplicable.

The second exception to the exclusion of stock as personal property is the exception most likely to apply to market neutral investment strategies. The legislative history to the Code suggests that a straddle consisting of stock and "substantially similar or related property" (hereafter "substantially similar property") includes (a) offsetting positions consisting of stock and a convertible debenture of the same corporation where the price movements of the two positions are related, and (b) a short position in a stock index RFC (or, alternatively, an option on such an RFC or an option on the stock index) and stock in an investment company whose principal holdings mimic the performance of the stocks included in the stock index (or, alternatively, a portfolio of stocks whose performance mimics the performance of the stocks included in the index).[55] The legislative history also suggests that stock index futures or options entered into to hedge general market risks associated with a diversified stock portfolio are not "substantially similar property" of the type that would subject the stock to the straddle rules [H.R. Conf. Rep. No. 861, 98th Cong., 2d Sess. 818-819 (1984)]. The Treasury Department, however, takes the position that only direct interests in stock and short sales of stocks are excluded from the straddle rules [Prop. Treas. Reg. §1.1092(d)-2(c)].

The Treasury Department has issued regulations defining "substantially similar property" for purposes of the straddle rules [Treas. Reg. §1.1092-2(a)]. Under these regulations, the first step is to determine if the index underlying the option or futures position reflects the value of 20 or more stocks of unrelated corporations. If so, the position is "substantially similar" to the stocks held by the taxpayer *only* to the extent the position and the taxpayer's stockholdings "substantially overlap" as of the most recent testing date [Treas. Reg. §1.246-5(c)(1)(ii)].[56] A position may be "substantially similar" to a taxpayer's entire stockholdings or to only a portion of those holdings [Treas. Reg. §1.246-5(c)(1)(ii)].

Treasury regulations provide the following three-step procedure to determine whether a taxpayer's position and stock portfolio "substantially overlap" [Treas. Reg. §1.246-5(c)(1)(iii)].

Step One: Construct a subportfolio that consists of stock in an amount equal to the lesser of the fair market value of each stock represented in the position and the fair market value of the stock in the taxpayer's portfolio.

Step Two: If the fair market value of the subportfolio is equal to or greater than 70% of the fair market value of the stocks represented in the position, the position and the subportfolio "substantially overlap."

Step Three: If the position does not "substantially overlap" with the subportfolio, repeat Steps One and Two, reducing the size of the position. The largest percentage of the position that results in a "substantial overlap" is "substantially identical" to the subportfolio determined with respect to that percentage of the position.

If a taxpayer holds a futures or options position on an index that reflects the value of less than 20 stocks, the position is treated as a separate position with respect to each of the stocks [Treas. Reg. §1.246-5(c)(1)(iv)]. If, for example, a taxpayer holds shares in corporations A, B, and C, and the index position reflects the values of stocks B, C, and D, the degree of overlap is determined solely on the basis of the fair market values of the shares held and the stocks represented in the index on a stock-by-stock basis. Thus, if the taxpayer holds 100 shares of corporation A but the index position reflects the value of only 10 shares of A, the index position is "substantially identical" with respect to 10% of the A stock held by the taxpayer.

Operation of the Straddle Rules

A number of complex rules govern the timing and character of losses recognized with respect to a straddle, and special rules relate to the capitalization of certain expenses relating to straddles. When only one of the positions in a straddle consists of a Section 1256 contract, the operation of the timing and characterization rules depends in part on whether the taxpayer elects to treat the straddle as an "identified mixed straddle" or to include the straddle in a "mixed straddle account" [see Code secs. 1092(b)(2) and 1256(d) and Treas. Reg. §§1.1092(b)-3T and 5T]. Given the complexity of these elections, the remainder of this discussion assumes that neither of these elections is made with respect to a straddle consisting of stock and an RFC.

One of the significant tax consequences resulting from a straddle is the deferral of the recognition of loss from the "disposition" of one position in the straddle to the extent there is an unrecognized gain on the offsetting position [Code sec. 1092(a)(1)(A)].[57] When one (but not both) of the positions in a straddle consists of a Section 1256 contract, special "modified wash sale" rules apply prior to application of the general loss deferral rules. Under these special rules, any loss on the disposition of stock that constitutes a position in a straddle is not taken into account if, within the 61-day period surrounding the date of disposition, the taxpayer acquires or enters into a contract or option to acquire "substantially identical" securities in a taxable transaction [Treas. Reg. §1.1092(b)-1T(A)(1)]. Where a taxpayer disposes of less than all of the straddle positions, any loss arising on the disposition of one straddle position is deferred to the extent that the unrecognized gain remaining at the close of the year in any of the following three specified positions exceeds the amount of loss disallowed under the general modified wash sale rule: (a) "successor position"; (b) an offsetting position to the loss position; or (c) an offsetting position to any "successor position" [Treas. Reg. §1.1092(b)-1T(a)(2)].[58] There are a number of additional complexities involved in applying the general loss deferral rules and the modified wash sale rules, which are beyond the scope of this chapter.

Any loss that is currently disallowed under the loss deferral rules discussed above is carried forward and treated as sustained in the following year, to the extent the deferral rules do not apply in that year [Treas. Reg. §1.1092(b)-1T(b)]. Treasury regulations provide detailed guidance for determining when a taxpayer can claim a deduction for a deferred loss that is carried forward [Treas. Reg. §§1.1092(b)-1T(b) and 1T(g), Exs. 19, 20, and 21].

If the disposition of a loss position would result in a capital loss, then that character is preserved once the loss is allowed as a deduction, regardless of how a gain or loss on any successor position would be treated [Treas. Reg. §§1.1092(b)-1T(c)(1)]. Similarly, if the original loss position would have been subject to the special 60% long-term/40% short-term capital loss treatment provided under Code section 1256, the deferred loss is also subject to that treatment, even if the gain or loss on a successor position would be treated as a 100% long-term or 100% short-term capital gain or loss [Treas. Reg. §1.1092(b)-1T(c)(2)].

Positions in a straddle are also subject to special "modified short sale rules" [Code sec. 1092(b)(1)], which operate in a manner similar to **Rule 2** governing short sales, with the concept of "offsetting positions" substituting for "substantially identical property." In certain cases, these special rules may terminate a taxpayer's holding period in a straddle position. For example, when the taxpayer has held property for less than one year and the property constitutes a position in a straddle, the holding period for the property would be deemed to begin at the time the offsetting position or positions are disposed of. (This holding-period termination rule does not apply to positions the taxpayer held for at least a year before establishing the straddle that includes the positions [Treas. Reg. §1.1092(b)-2T(a)(2)].) Further, a loss on the disposition of a straddle position (a "loss position") is generally treated as a long-term capital loss if (a) on the date the taxpayer entered into the loss position, the taxpayer held directly, or indirectly through a related person or flow-through entity (e.g., a partnership), one or more positions offsetting to the loss position, and (b) all gain or loss on at least one position in the straddle would have been treated as a long-term capital gain or loss if the position had been disposed of on the date the loss position was entered into [Treas. Reg. §1.1092(b)-2T(b)(1)].

Special loss characterization rules apply when at least one, but not all, of the positions in a straddle is a Section 1256 contract [Treas. Reg. §1.1092(b)-2T(b)(2)]. These rules are meant to prevent a loss on a Section 1256 contract from operating to convert an unrelated short-term capital gain into a 60% long-term capital gain under the special 60/40 capital gain and loss treatment provided in Code section 1256.

Finally, special capitalization rules apply to prevent the current deductibility of certain otherwise deductible financing and carrying expenses incurred with respect to a straddle. In particular, no current deduction is allowed for interest and carrying charges properly allocable to personal property that is part of a straddle. These expenditures must be capitalized and added to the tax basis of the property for which the expenditures were made, thereby reducing the gain or increasing the loss recognized upon the subsequent disposition of the property [Code sec. 263(g)(1)].

This capitalization requirement applies to interest on indebtedness "incurred or continued to purchase or carry" the personal property and to amounts paid or incurred to carry the property, including charges to insure, store, or transport the property ("carrying charges") [Code sec. 263(g)(2)].[59] The amount of capitalizable interest and carrying charges is reduced by the sum of (a) the amount of interest (including original issue discount); (b) any amount includible in income under specified statutory rules that generally treat a discount as equivalent to interest [see Code secs. 1271(a)(3)(A), 1278, and 1281(a)]; (c) any dividends with respect to the property (as reduced by any corporate dividends-received deduction); and (d) any amount received by, and includible in the income of, the lender of securities (generally the securities to be used in a short sale) [Code section 263(g)(2)(B)].

CONCLUSION

Market neutral investors combine diverse assets and divergent positions in very specific ways. Thus, market neutral equity investors combine long and short equity positions; convertible arbitrage investors may hold convertible debt while shorting the stock of the debt's issuer; a sovereign fixed income portfolio will trade government bonds against futures contracts and interest rate swaps. The tax implications of these positions may be difficult to determine, not only because they involve somewhat esoteric instruments such as swaps and options and nonstandard trading techniques such as short selling, but because of the interactions between the combined positions. In particular, the holding period for tax purposes—

whether gains and losses are considered short term or long term—and even the nature of gains or losses themselves—whether capital or ordinary—may differ from what they would have been had the same assets been held separately, rather than in combination.

Because of the complexity of the tax considerations involved, taxable investors should consult professional tax advisers before investing in market neutral strategies. They should be particularly careful to ensure that the manager of a market neutral strategy is aware of the strategy's tax implications for taxable investors. Nevertheless, when properly structured and managed, a market neutral strategy may be able to provide an attractive opportunity for taxable investors seeking active investment returns.

NOTES

[1] In many short sales, the short seller does not own the securities sold short at the time of the sale and is required to borrow these securities (usually from a broker–dealer) to make the required delivery. However, in a "short sale against the box," the short seller already owns the securities, but chooses to borrow additional, identical securities to sell short. In this situation, the short seller subsequently closes the sale by either (a) delivering to the lender the securities that were held at the time of the short sale, or (b) purchasing identical securities in the market and delivering them to the lender. Under current law, a sale of appreciated stock that is short against the box will generally constitute a constructive sale of an appreciated financial position and be subject to special tax rules. See Code sections 1259(c)(1)(A) and (D), as discussed in the text.

[2] This rule also applies to a "related person" to the short seller, including members of the short seller's immediate family and certain entities in which the short seller has more than a 50% ownership interest, either actually or constructively (through the operation of specified stock attribution rules). See Code sections 1259(c)(1), 1259(c)(4), 267(b), and 707(b).

[3] For purposes of the constructive sale rules, an "appreciated financial position" generally means any position (i.e., an interest, including a futures or forward contract, short sale, or option) with respect to any stock, debt instrument, or partnership interest if the taxpayer would recognize a gain if the position were sold, assigned, or otherwise terminated at its fair market value [Code secs. 1259(b)(1) and (b)(3)]. However, the term does not include any position with respect to debt if (a) the debt unconditionally entitles the holder to a specified principal amount; (b) the interest payments (or other similar amounts) with respect to such debt are based on a fixed rate or, to the extent provided in Treasury regulations, a variable rate; and (c) such debt is not convertible (directly or indirectly) into stock of the issuer or any "related person" [Code sec. 1259(b)(2)(A)]. Any position that is marked to market under any provision of the Code (e.g., a regulated futures contract subject to Code section 1256) is also excluded from the definition of an "appreciated financial position" [Code sec. 1259(b)(2)(C)].

[4] There is no statutory definition of the term "substantially identical stock or securities" for purposes of the constructive sale rules. However, it appears likely that this term will have the same meaning for purposes of the constructive sale rules as it has for the rules relating to "wash sales" of securities. For wash sale purposes, the stocks, bonds, or preferred stocks of one corporation are generally not regarded as "substantially identical" to the common stock of another corporation [Treas. Reg. §1.1233-1(d)(1)], although when-issued securities of a successor corporation might be viewed as "substantially identical" to the securities to be exchanged in a reorganization [Treas. Reg. §1.1233-1(c)(6), Ex. 6]. However, where preferred stocks or bonds are convertible into the common stock of the same corporation, the relative values, price changes, and other circumstances may indicate that the convertible securities are "substantially identical" to the common stock [Treas. Reg. §1.1233-1(d)(1)]. For example, in *Revenue Ruling* 77-201, 1977-1 C.B. 250, the IRS ruled that convertible preferred stock is "substantially identical" to the common stock into which it is convertible when the preferred stock (a) has the same voting rights and dividend restrictions as the common stock; (b) trades at prices that do not vary significantly from the conversion ratio; (c) has prices that rapidly adjust to changes in the price of the common stock; and (d) is not restricted as to convertibility. Bonds and other debt instruments are not "substantially identical" if they differ substantially in any one material feature or in several material features considered together [*Revenue Ruling* 58-210, 1958-1 C.B. 523 and *Revenue Ruling* 58-211, 1958-1 C.B. 529]. For this purpose, the material features of a debt instrument include the identity of the issuer or obligor on the instrument, the interest rate, the value of assets or security, preferences, retirement conditions, maturity dates, and call provisions. Interest payment dates, issuance dates, and whether the debt instruments are registered or bear coupons are not considered material features for this purpose [*Revenue Ruling* 58-210, *supra*]. In general, debt instruments of different issuers or obligors are not considered to be "substantially identical." Further, the fact that two debt instruments have the same value does not necessarily establish that the instruments are "substantially identical" [*Revenue Ruling* 58-211, *supra*].

[5] In *Revenue Ruling* 2002-44, 2002-2 8 IRB 84, the IRS addressed two situations involving a taxpayer who entered into a short sale of stock and directed his broker to purchase the stock sold short on December 31 in a regular trade and close out the short sale in January of the succeeding taxable year. Where the value of the purchased stock has increased (so that the value of the short position has depreciated), the IRS held that the taxpayer should recognize the loss on the short sale in the year in which this sale is closed. However, where the purchased stock has depreciated in value (so that the value of the short position has appreciated), the IRS held that the taxpayer should realize the gain on the December 31 "trade date" when the broker purchased the stock. In reaching this latter conclusion, the IRS reasoned that because the value of the short sale position has increased, the taxpayer holds an "appreciated financial position" so that a constructive sale occurred in December when the taxpayer acquired the same stock as that underlying the short sale [see Code sec. 1259(c)(1)(D)].

[6] "Substantially identical" is not statutorily defined for purposes of **Rules 1** through **3**. The determination of whether securities are "substantially identical" to the shorted securities depends on the facts and circumstances of each case. How-

ever, as with constructive sales, this term generally has the same meaning as it has for purposes of the wash sale rules [Treas. Reg. §1.1233-1(d)(1)].

[7] The legislative history associated with the 2003 Tax Act notes that individual taxpayers who receive "substitute" payments in lieu of dividends from short sale and similar transactions may nevertheless treat the payments as dividend income to the extent that the payments are reported to them as dividend income on their Forms 1099-DIV received for the calendar year 2003, unless they know or have reason to know that the payments are in fact in lieu of dividends rather than actual dividends. Congress expects that the IRS will issue guidance as quickly as possible on reporting by securities brokers with respect to payments made in lieu of dividends to individual lenders of stock [see H.R. Conf. Comm. Rep. No. 108-12].

[8] If the investor owns or acquires the underlying securities before the exercise or lapse of the put option, the special statutory rules applicable to straddles may apply, in which case the modified short sale rules may apply [Code sec. 1092].

[9] An investor is deemed to hold "substantially identical property" acquired for arbitrage at the close of any business day if the investor has the right to receive or acquire "substantially identical" property either through ownership of any other property acquired for arbitrage operations or any contract it has entered into in an arbitrage operation to receive or acquire "substantially identical" property [Code sec. 1233(f)(3) and Treas. Reg. §1.1233-1(f)(2)(i)].

[10] Prior to the enactment of Code section 1233(f), the holding period for securities acquired for investment purposes was terminated pursuant to the ordering rule of **Rule 2** if the investor subsequently acquired substantially identical securities in connection with arbitrage operations. Congress enacted Code section 1233(f) in recognition that many arbitrage transactions are not designed to convert short-term capital gains into long-term capital gains and actually serve to facilitate the self-regulation of the stock market [S. Rep. No. 1255 (84th Cong., 1st Sess.) at 2-3 (1955)].

[11] For example, the purchase of convertible bonds, together with the short sale of the stock that may be acquired upon conversion of the bonds, may qualify as an arbitrage operation. Similarly, an arbitrage operation may also include the purchase of stock rights and the short sale of the stock to be acquired upon the exercise of such rights [Treas. Reg. §1.1233-1(f)(3)].

[12] Treasury Regulation §1.1233-1(c)(H), Example (6) assumes that when-issued shares of common stock in the acquirer in a tax-free reorganization are substantially identical to the preferred stock of the target, although the example does not set forth the relevant facts governing this determination.

[13] Support for this position is found in General Counsel Memorandum 39304 (November 1984), which the IRS issued in the context of analyzing the applicability of the short sale rules to a merger arbitrage transaction involving an arbitrageur's purchase of the stock of the target and short sale of the stock of the acquirer at a time prior to the approval of the merger by the shareholders of either corporation. The IRS concluded that, on the date of the short sale, the stock of the target was not "substantially identical" to the stock of the acquirer within the meaning of Code section 1233(b).

[14] This ruling appears to be premised on the application of the tacked-on holding-period rule contained in Code section 1223(1) to nontaxable exchanges of property. Code section 1223(1) provides that a taxpayer's holding period for property re-

ceived in an exchange of a capital asset will include the holding period of the exchanged capital asset if the property received has a tax basis determined, in whole or in part, by reference to the tax basis of such capital asset.

[15] In reaching this conclusion, the IRS also relied upon the fact that the wash sale rules contained in Code section 1091 expressly apply only to "acquisitions" of "substantially identical property" pursuant to a purchase or a taxable exchange. While the statutory provisions governing short sales do not contain this express limitation on the scope of the term "acquisition," the IRS stated that there is no basis for excluding nontaxable exchanges from the operation of the wash sale rules but including such exchanges within the scope of the short sale rules.

[16] In other words, the convertible debt security is not treated as an "investment unit" for purposes of the special rules relating to original issue discount. For this purpose, the term "related party" has the meaning provided by Code sections 267(b) and 707(b)(i).

[17] In the case of an agreement or arrangement that does not technically qualify as an NPC but that has the same or similar economic substance and is entered into for the purpose of avoiding the NPC Regulations, the IRS is authorized to apply the tax rules provided in the NPC Regulations [Treas. Reg. §1.446-3(g)(1)].

[18] For this purpose, the term "objective financial information" means any current, objectively determinable financial or economic information that is not within the control of any of the counterparties to the contract and is not unique to the circumstances of one of the counterparties (e.g., the dividends or stock price of a counterparty). However, a specified index can be based on a broad-based equity index or a pool of mortgages [Treas. Reg. §1.446-3(c)(4)(ii)].

[19] As discussed more fully in the section "Section 1256 Contracts," a "Section 1256 contract" means any regulated futures contract, any foreign currency contract, any nonequity option, or any dealer equity option [Code sec. 1256(b)].

[20] While an option or forward contract entitling a person to enter into an NPC is not itself an NPC, the tax treatment of payments made under such an option or forward contract may be governed by the special rules provided in the NPC Regulations for nonperiodic payments if and when the underlying NPC is entered into [Treas. Reg. §§1.446-3(c)(1)(i) and 1.446-3(c)(3)].

[21] In order to prevent taxpayers from using the NPC timing rules to materially distort income, if a taxpayer enters into a transaction with a "principal purpose" of applying the NPC Regulations to produce such an income distortion, the IRS is authorized to depart from the prescribed rules as necessary to reflect the appropriate timing of income and deductions from the transaction [Treas. Reg. §1.446-3(i)]. Contrarily, where an agreement or arrangement does not technically qualify as an NPC but has the same or similar economic substance and is entered into for the purpose of avoiding the NPC rules, the IRS may subject such an agreement or arrangement to the tax rules provided in the NPC Regulations [Treas. Reg. §1.446-3(g)(i)].

[22] These special timing rules are overridden and do not apply to any dealer that is required by Code section 475 to account for NPCs under the mark-to-market method at the end of each year (or any trader in securities that elects a mark-to-market treatment) [Treas. Reg. §1.446-3(c)(iii)]. Further, "significant" nonperiodic payments under an NPC may be deemed to constitute payments on an embedded loan, the interest income or expense of which would be accounted for under the interest accrual rules.

[23] The NPC Regulations do not provide any clear definition of the term "significant" for purposes of this rule. The two examples provided suggest that the nonperiodic payment should be compared with the present value of the total amount of fixed payments due under the swap [Treas. Reg. §1.446-3(g)(6), Exs. 2 and 3]. In one example, the nonperiodic payment equals 66.7% of the net present value of the fixed payment on the swap; in this case, the payment is considered "significant" and the swap premium is treated as an embedded loan. In the other example, the nonperiodic payment equals only 9.1% of the present value of the fixed payment on the swap and is not considered "significant." Between the two percentages covered in these examples there is substantial uncertainty as to whether a particular nonperiodic payment will be regarded as "significant."

[24] If it is not possible to reasonably estimate the value of the specified index as of the last day of the year, then either counterparty is permitted to use an estimate it believes to be reasonable provided that the taxpayer (and any related person that is a party to the NPC) uses the same method to make the estimate consistently from year to year and uses the same estimate for purposes of all financial reports to equity holders and creditors.

[25] For this purpose, a dealer in NPCs is a person who regularly offers to enter into, assume, offset, assign, or otherwise terminate positions in NPCs with customers in the ordinary course of a trade or business [Treas. Reg. §1.446-3(c)(4)(iii)].

[26] If the swap contract does not contemplate any periodic payments, a principal-recovery payment is deemed to be made on each date the recipient of the nonperiodic payment is obligated to make a periodic payment under the contract [Treas. Reg. §1.446-3(f)(2)(iii)(A)].

[27] If both parties make nonperiodic payments, this calculation is done separately for the nonperiodic payments made by each party [Treas. Reg. §1.446-3(f)(2)(iii)(B)].

[28] The NPC Regulations acknowledge that the Black-Scholes model is the standard technique used by the financial industry for pricing interest rate cap and floor agreements [Treas. Reg. §1.446-3(f)(4), Ex. 1].

[29] In the interest of preventing abusive manipulation under the alternative amortization methods for swaps, caps, and floors, a taxpayer that, either directly or through a "related person," reduces risk with respect to an NPC by purchasing, selling, or otherwise entering into other NPCs, futures, forwards, options, or other financial contracts (other than debt instruments) cannot use the alternative methods for recognizing upfront swap payments and premiums for caps and floors. A related person includes a person related to one of the parties to the NPC within the meaning of Code section 267(b)(i) or a member of the same consolidated group as one of the counterparties [Treas. Reg. §1.446-3(c)(4)(i)].

[30] The NPC Regulations do not provide any rules regarding caps and floors that are "significantly in-the-money" [Treas. Reg. §1.446-3(g)(5)]. Treasury regulations proposed in 1991 provide that the time-value component of such a cap or floor should be recognized as interest for all federal tax purposes. Under these proposed regulations, this time-value component is the ratable daily portion of the cap or floor premium that is recognized for the taxable year, multiplied by the discount rate used by the counterparties to determine the amount paid for the cap or floor, as compounded from the date the premium is paid to the earlier of the date the option contract expires or the end of the taxable year. However, the time-value component cannot exceed the

net income or deduction from the cap or floor for the taxable year computed without regard to this rule [Prop. Treas. Reg. §1.446-3(e)(4)(iv)].

[31] Although a contingent final payment terminates the rights and obligations of both parties to an NPC, it could be argued that the term "termination payment" refers only to payments not scheduled under the terms of the NPC. On the other hand, the preamble to the NPC Regulations states that: "the final regulations do not include any examples of how to treat nonperiodic payments that are not fixed in amount at the inception of the contract. The IRS expects to address contingent payments in future Treasury Regulations" [T.D. 8491, 1993-2 C.B. 215, 216]. To date, no such regulations have been issued, but the IRS has recently requested comments on the issue [Notice 2001-44, 2001-2.CB 77]. See note 31, *infra*. In *Revenue Ruling* 2002-30, 2002-21 IRB 971, the IRS appears to take the position that all scheduled payments made on the maturity of an NPC are "nonperiodic payments," whether contingent or noncontingent.

[32] If a contingent final payment is properly treated as a termination payment, the payment would be taxable to the recipient counterparty in its taxable year within which the NPC terminates [Treas. Reg. §1.446-3(h)(2)]. However, if a contingent final payment constitutes a nonperiodic payment, the NPC Regulations provide for the taxation of such payment "over the term of the [NPC] in a manner that reflects the economic substance of the contract." Since the right of a counterparty to receive a contingent final payment and the amount of such a payment, if any, cannot be determined until the termination of the NPC, taxpayers generally take the position under the currently applicable rules that any accrual of the payment in a taxable year prior to the year in which the NPC terminates would clearly be speculative and not reflective of the "economic substance" of the NPC. Such deferred recognition treatment is consistent with the general income recognition rules outside the NPC context for both cash-basis taxpayers (which do not recognize income until the income is actually or constructively received) and accrual-basis taxpayers (which do not recognize income until all events have occurred that fix the right to receive such income and the amount therefore can be determined with reasonable accuracy) [Treas. Reg. §1.451-1(a)].

[33] In Notice 2001-44, *supra* note 29, the IRS evaluated four alternative methods of taxing contingent final payments under NPCs. Each of these methods was evaluated by the IRS in light of the following six fundamental tax policy principles: (a) whether the method provides sufficient certainty regarding the amount and timing of income inclusions and deductions; (b) whether the method is complex and creates compliance and administrative burdens to the taxpayer; (c) whether the method creates or increases inconsistencies in the tax treatment of financial instruments with similar economic characteristics; (d) whether the method creates or increases inconsistencies in the tax treatment of different taxpayers entering into the same financial instruments; (e) whether the method accurately reflects the accretion or reduction in economic wealth in the period in which the taxpayer is measuring the tax consequences of being a party to the NPC; and (f) whether the method has sufficient flexibility to accommodate readily new financial arrangements.

In *Revenue Ruling* 2002-30, *infra*, the IRS addressed the taxation of an NPC that required a counterparty to make both noncontingent and contingent payments to the taxpayer upon the maturity of the NPC. Stating that the noncontingent and contingent components of the NPC must be treated separately for tax purposes "in order to reflect the economic substance of the [NPC]," the IRS held that the taxpayer must accrue the noncontingent payment into income over the term of the NPC. However, the *Revenue Ruling*'s silence with respect to the taxation of the contingent component of the NPC has created some confusion regarding whether the IRS also takes the view that under the current rules the contingent component should also be taxed over the term of the NPC under the same methodology. See also Notice 2002-35, 2002-21 IRB 992, where the IRS examined the tax-avoidance use of NPCs structured in a manner similar to those described in *Revenue Ruling* 2002-30.

[34] This treatment is consistent with the well-established definition of interest as compensation for the use or forbearance of money [*Deputy v. du Pont*, 308 U.S. 488 (1940)]. Because NPCs do not generally involve a loan of money (i.e., the notional principal amount is not exchanged and no repayment obligation exists), payments pursuant to an NPC would not satisfy this definition of interest.

[35] The IRS has issued a Private Letter Ruling and a Technical Advice Memorandum indicating that periodic and nonperiodic payments produce ordinary income and expense when not part of a hedging transaction [Private Letter Ruling 9824026 and Technical Advice Memorandum 9730007].

[36] Rather, such payments represent the performance by the counterparties of their respective contractual obligations under the NPC. In the absence of a Code provision to the contrary, the courts generally have held that the extinguishment of contract rights and obligations does not constitute a "sale or exchange" for federal income tax purposes because the contract right does not survive the payment. See, e.g., *Fairbanks v. U.S.*, 306 U.S. 436 (1939); *Riddell v. Scales*, 406 F.2d 210 (9th Cir. 1969); and *Leh v. Commissioner*, 260 F.2d 489 (9th Cir. 1958).

[37] Prior to the Tax Reform Act of 1997, Code section 1234A applied only to personal property that was "actively traded" (i.e., contracts based on the same or substantially similar specified indices are purchased, sold, or entered into on an established financial market, including an interdealer market).

[38] For tax purposes, a cash-settled option is any option that, on exercise, can be settled in cash or assets other than the assets underlying the option [Code sec. 1234(c)(2)(B)]. A cash-settled option is treated as an option subject to the rules of Code section 1234 [Code sec. 1234(c)(2)(A)].

[39] A taxpayer may elect to exclude a Section 1256 contract that is part of a "mixed straddle" from treatment under Code section 1256, in which case the contract will fall under Code section 1234 [see Code secs. 1234(c)(1) and 1256(d)].

[40] Code section 1234 does not apply in determining the character of gain or loss on the following types of options: (a) options that are (or are identified as being a part of) a "hedging transaction" subject to the rules provided in Treasury Regulation §1.1221-2 [Treas. Reg. §1.1234-4]; (b) options treated as inventory or inventory-type property in the hands of the holder [Code sec. 1234(a)(3)(A)]; (c) options granted in the ordinary course of a taxpayer's trade or business of granting options [Code sec. 1234(b)(3)]; and (d) options granted as a form of compensation to the holder [Treas. Reg. §§1.1234-3(c)(1) and (d)]. In regard to (a), traders or investors in securities can generally not enter into a "hedging transaction" because a principal requirement of such a transaction is that the asset being hedged must constitute property that could generate ordinary income or loss, rather than capital gain or loss, if sold or ex-

changed [Treas. Reg. §1.1221-2(b)]. On the other hand, Code section 1234 would apply to any gain or loss from the closing or lapse of an option, if the gain or loss on the sale or the exchange of the option would be considered a capital gain or loss by a dealer in securities under Code section 1236 and the Treasury regulations thereunder [Treas. Reg. §§1.1234-3(c)(1) and (2)].

[41] In general, a tax straddle is the simultaneous ownership of offsetting positions (e.g., an ownership interest or a regulated futures contract or other futures contract, forward contract, or option) in "actively traded personal property." For this purpose, positions are generally offsetting if the risk of loss from owning any particular position is substantially reduced by reason of the ownership of other positions. Thus, the purchase of a put option on stock could result in a straddle if the taxpayer owns (a) the stock underlying the put option; (b) stock or securities that are "substantially identical" to such underlying stock; or (c) other positions that are offsetting with respect to the put option. See the discussion under the heading "Straddles."

[42] Pursuant to Code section 1091, a "wash sale" generally occurs if a taxpayer sells stock or securities at a loss and, within a 30-day period before or after such sale, acquires, or enters into an option or contract to acquire, "substantially identical" stock or securities. The loss realized on a wash sale is currently disallowed and is added to the taxpayer's tax basis of the "substantially identical" stocks or securities.

[43] A person is treated as a "dealer" in SFCs if the IRS determines that the person performs functions with respect to such contracts that are similar to the functions performed by persons registered with an appropriate national securities exchange as an options market maker or specialist [Code sec. 1256(g)(9)(B)]. *Revenue Procedure* 2002-11, 2002-7 IRB 526 notes that in light of the fact that some SEC and CFTC requirements have not yet been issued in final form, the IRS will issue private letter rulings on requests from exchanges trading or expected to trade SFCs as to when persons trading these contracts will be considered "dealers."

[44] In Field Service Advice 200041006, the IRS interpreted the phrase "on or subject to" to include the actual execution of the contract on the exchange and the continuing relationship between the contract and the exchange, as reflected in the need to mark to market and the use of a designated clearinghouse for settlement. Contracts traded in an over-the-counter market are therefore not traded "on or subject to" an exchange.

[45] The legislative history of Code section 1256 describes the interbank market as an informal market through which certain foreign currency contracts are negotiated among commercial banks. Such contracts are generally entered into by commercial banks and futures commission merchants [H.R. Rep. No. 794, 97th Cong., 2d Sess. (1982) at 23; S. Rep. No. 592, 97th Cong., 2d Sess. (1982) at 26]. In Field Service Advice Memorandum 200025020, the IRS indicated that the "interbank market" refers to the over-the-counter market maintained by banks and investment banks to purchase and sell foreign currency and financial products.

[46] The legislative history to this provision provides that this last requirement is satisfied if the price is obtainable from a bank that is a substantial participant in the interbank market [H.R. Rep. No. 986, 97th Cong., 2d Sess. (1982) at 25].

[47] According to the legislative history of Code section 1256, the fair market value of each Section 1256 contract on the last business day of a taxable year is generally the settlement price for the contract as determined by the appropriate exchange

[see Staff of the Joint Committee on Taxation, 97th Cong., 1st Sess., *General Explanation of the Economic Recovery Act of 1981*, pp. 296–297 (Comm. Print 1981) ("1981 Blue Book")].

[48] For purposes of determining the capital losses from Section 1256 contracts that may be carried forward, any losses that were absorbed in a carry-back year are treated as capital gains in the 40% short-term/60% long-term ratios for the loss year. Any remaining capital losses attributable to Section 1256 contracts are then carried forward as losses from Section 1256 contracts for that year.

[49] The fair market value for this purpose is the "fair market value at the time of the termination (or transfer), which ordinarily is the actual price received or paid if the termination is a closing transaction" ["1981 Blue Book," p. 297].

[50] As regards equity securities, an "established financial market" includes any national securities exchange registered under Section 6 of the Securities Exchange Act of 1934, any interdealer quotation system sponsored by a national securities association registered under Section 15A of the Securities Exchange Act of 1934, and any foreign securities exchange that satisfies analogous regulatory requirements under the law of the jurisdiction in which it is organized (e.g., the International Stock Exchange of the United Kingdom and the Republic of Ireland, Limited, the Frankfurt Stock Exchange, and the Tokyo Stock Exchange) [Treas. Reg. §§1.1092(d)-1(a), (b)(1), and 1(b)(1)(iv)].

[51] These four presumptions apply if (a) the positions are in the same personal property (whether established in the property itself or in a contract for the property); (b) the positions are in the same personal property, even though the property may be in substantially altered form; (c) the positions are in debt instruments of a similar maturity or other debt instruments described in Treasury regulations; and (d) there are other factors, including objective or subjective tests, prescribed by Treasury regulations indicating that such positions are offsetting. The other two rebuttable presumptions apply where (a) the two positions are sold or marketed as offsetting positions (whether or not such positions are called a straddle, spread, butterfly, or any similar name) and (b) the aggregate margin requirement for the two positions is lower than the sum of the margin requirements for each position held separately [Code secs. 1092(c)(2)(B) and (c)(3)].

[52] In a Private Letter Ruling concerning a "costless" collar placed on publicly traded stock held by a taxpayer, the IRS concluded that (a) the two positions consisting of the put option and the taxpayer's stock constituted a straddle; (b) the short call option position and the taxpayer's stock also constituted a straddle; and (c) in the absence of such Treasury regulations, it was permissible for the taxpayer to identify which shares of the publicly traded stock were part of the straddle and which shares were used as collateral for a margin loan agreement that the taxpayer entered into with a lender. In this ruling, the taxpayer collateralized its loan with shares of stock in the same corporation on which the collar was placed. However, the taxpayer collateralized the loan with different shares of stock, which it transferred to a separate designated account and identified the shares transferred into this account [see Private Letter Ruling 199925044].

[53] In *Revenue Ruling* 88-31, 1988-1 C.B. 302, the IRS held that publicly traded stock and certain cash settlement contingent payment rights relating to that stock constituted a straddle. The ruling concluded that the contingent payment rights

constituted a cash settlement put option for federal income tax purposes, which is treated as an option to buy or sell property under Code section 1234(c)(2).

[54] Code section 1092(c)(4) defines a "qualified covered call option" as a covered call option that satisfies the following requirements: (a) the option is not part of a larger straddle; (b) the option is traded on a national securities exchange; (c) the gain or loss from the option is not treated as ordinary income or loss; (d) the option was granted more than 30 days before its expiration; (e) the option is not deep-in-the-money; and (f) the option is not granted by an option dealer (as defined by Code section 1256(g)(8)) in connection with the activity of dealing in options.

In January 2000, the IRS issued final regulations providing that strike prices established by equity flex options (i.e., options that provide the parties with the ability, limited by certain restrictions imposed by the exchange, to establish terms that are different from the terms of standardized exchange-traded options on the same equity security) are not taken into account in determining whether standardized equity options are "deep-in-the-money" [Treas. Reg. §1.1092(c)-1(b)]. In April 2002, the IRS finalized new regulations relating to the application of the qualified covered call option (QCCO) exception to the straddle rules to equity flex options and long-term options for QCCOs entered into on or after July 29, 2002 [Treas. Reg. §1.1092(c)-1(c)]. These regulations provide that equity flex options may qualify as QCCOs provided that (a) they satisfy the general statutory definition for a QCCO treatment (see Code section 1092(c)(4)); (b) they are not for a term longer than one year (extended to 33 months in certain circumstances); (c) they provide for only two payments (a single premium paid not later than five business days after the option grant and a single fixed stock price stated as a dollar amount that is fully payable upon exercise or shortly thereafter); and (d) an equity option with standardized terms is outstanding for the underlying security [Treas. Reg. §1.1092(c)-2]. These same regulations provide that certain over-the-counter options may be QCCOs (i.e., an option entered into with a person registered with the SEC as a broker-dealer or alternative trading system and meeting the same requirements for QCCO treatment that apply to equity flex options) [Treas. Reg. §1.1092(c)-3]. Finally, these regulations provide that a standard equity option may qualify as a QCCO only if it has a term not longer than one year (extended to 33 months in certain circumstances), although the IRS has requested comments on this issue [Treas. Reg. §1.1092(c)-2(b)].

[55] Staff of the Joint Committee on Taxation, 98th Cong., 2d Sess., *General Explanation of the Revenue Provisions of the Deficit Reduction Act of 1984* at 309 (Comm. Print 1985) (the "1984 Blue Book").

[56] A testing date is (a) any day on which the taxpayer buys or sells any stock if the fair market value of the stock or the fair market value of the substantially similar property is reflected in the position; (b) any day on which the taxpayer changes the position; or (c) any day on which the composition of the position changes [Treas. Reg. §1.246-5(c)(i)(iv)].

[57] For purposes of these rules (a) a "disposition" can result from a sale, exchange, cancellation, lapse, expiration, or other termination of a right or obligation with respect to actively traded property [Treas. Reg. §1.1092(b)-5T(a)], and (b) an unrecognized gain is the gain that would be taken into account if the position were sold on the last business day of the taxable year at its fair market value (including

any realized gain that had not yet been recognized) [Code secs. 1092(a)(3)(A)(i) and (ii)]. In the case of a regulated futures contract, fair market value is determined by the final settlement price set by the futures exchanges for each contract on the final trading day of the year ["1981 Bluebook" at 285-286].

58 The remaining position may be offsetting to the position(s) that sustained the loss (the "loss position"), a successor position, or a position offsetting to the successor position. A successor position is a position that is, or was at any time, offsetting to a second position, where (a) the second position was offsetting to a loss position that has been disposed of, and (b) the new position is entered into during the 61-day period surrounding the disposition of the loss position [Treas. Reg. §1.1092(b)-5T(n)]. Under this definition, a successor position will generally be on the same side of the market (long or short) as the position disposed of.

59 The IRS has issued proposed regulations that would provide (a) a definition of "personal property" for purposes of Code section 263(g); (b) definitions of the terms "interest" and "carrying charges"; (c) guidelines for the operation of the capitalization rules; and (d) guidance regarding the circumstances under which an issuer's obligations under a debt instrument can be a position in actively traded personal property and, therefore, part of the straddle [Prop. Treas. Reg. §1.263(g)-5].

CHAPTER 11

Tax-Exempt Organizations and Other Special Categories of Investors: Tax and ERISA Concerns

Peter E. Pront, Esq.
Partner
Seward & Kissel LLP

S. John Ryan, Esq.
Partner
Seward & Kissel LLP

This chapter discusses the significant tax issues that may affect those institutional market neutral investors that generally are not subject to federal income taxation. These investors encompass a wide array of entities, including tax-exempt organizations such as qualified retirement plans, individual retirement accounts, publicly supported charities and private foundations, foreign corporations, and mutual funds. The chapter also considers the circumstances under which investors usually not subject to the Employee Retirement Income Security Act of 1974 (ERISA), as amended, may become subject to the fiduciary standards of ERISA. The discussion here is based on the Code (existing and proposed), regulations issued by the Treasury Department and the U.S. Department of Labor (DOL), and judicial decisions and administrative pronouncements as they exist as of July 1, 2003. All of these are subject to change, possibly with retroactive effect.

As discussed below, the sophisticated investment strategies utilized in market neutral investing may create certain tax issues for tax-exempt investors. For example, tax-exempt investors may become subject to federal income taxation to the extent that their market neutral investment strategies involve the use of leverage (either directly or through an investment partnership in which they are a partner). In this event, tax-exempt investors might consider making their market neutral investments through a corporation formed outside of the United States. Non-U.S. investors need to consider the U.S. withholding tax implications applicable to certain market neutral investment strategies, particularly those that may generate a significant amount of dividend income from U.S. corporations, as well as the U.S. taxation of their investments in U.S. entities that directly or indirectly own a significant amount of real property located in the United States.

As discussed in the preceding chapter with respect to taxable investors, tax-exempt organizations may find it prudent to access market neutral strategies through an investment in an entity that provides protection against the incurrence of losses in excess of their capital investment in the entity. While this form of investment generally involves some pooling of assets with other investors, it is generally possible to create a limited liability company with the tax-exempt organization as the sole member.

UBTI FOR TAX-EXEMPT ORGANIZATIONS

Qualified retirement plans, individual retirement accounts, publicly supported charitable organizations (including endowments), private foundations, and other tax-exempt organizations (collectively, "Exempt Organizations") are generally exempt from federal income taxes on income derived from their tax-exempt activities [Code sec. 501(a)]. They may, however, be subject to federal income taxation of income that constitutes "unrelated business taxable income" (UBTI) [Code sec. 511(a)(1)]. Subject to certain specific statutory and regulatory modifications, UBTI for any taxable year is generally equal to the difference between the Exempt Organization's (a) gross income from any trade or business that is substantially unrelated (other than through the production of funds) to the exercise or performance of the Exempt Organization's exempt purpose or function and (b) the allowable deductions that are directly connected with such trade or business [Code secs. 512(a)(1) and (b) and 513]. UBTI also includes the income earned by the Exempt Organization from debt-financed property during the taxable year [Code sec. 514(a)]. Taxes on UBTI are imposed at the regular corporate tax rates for Exempt Organizations formed as entities other than trusts and at the tax rates applicable to trusts for entities formed as trusts [Code secs. 511(a)(1) and (b)(1)].

Exempt Organizations may incur UBTI through direct investments in securities and through their participation as limited partners in private securities partnerships. An Exempt Organization that is a limited or general partner in a partnership is treated as deriving a pro rata share of (a) any partnership gross income (whether or not distributed) that would have been UBTI to the Exempt Organization had it been received directly by the Exempt Organization, and (b) any deductions of the partnership directly connected with such gross income [Code sec. 512(c)].

While investment income derived by an Exempt Organization would generally constitute UBTI because such income is not "substantially related" to the organization's tax-exempt purpose, the Code and the applicable Treasury regulations prescribe certain modifications in computing UBTI, which exclude from UBTI most categories of investment income. These modifications are discussed in the following section.

Specific Modifications to UBTI

Pursuant to specific statutory modifications, an Exempt Organization can exclude from UBTI all dividends, interest, payments with respect to securities loans, amounts received or accrued as consideration for entering into agreements to make loans, and annuities, as well as all deductions directly connected with such income [Code sec. 512(b)(1) and Treas. Reg. §1.512(b)-1(a)(1)]. For this purpose, "payments with respect to securities loans" include income an Exempt Organization derives from lending securities from its portfolio to a broker in exchange for collateral. Such income includes, but is not limited to, interest earned on cash or securities pledged as collateral for the loan, dividends or interest paid on the loaned securities while in the possession of the borrower, and any fees payable by the broker with respect to the transaction [Code sec. 512(a)(5)(A)].[1]

Applicable Treasury regulations also exclude from UBTI income derived by an Exempt Organization from "notional principal contracts" (NPCs). NPCs constitute financial instruments that provide for the periodic exchange of payments between two counterparties, at least one of which periodically pays amounts calculated by applying a rate determined by reference to a specified index to a notional principal amount [Treas. Reg. §§1.512(b)-1(a) and 1.863-7(a)(1)]. As discussed in the preceding chapter, NPCs include interest rate swaps, currency swaps, equity swaps, basis swaps, and similar financial instruments. Other "substantially similar income" from "ordinary and routine investments" is also excluded from UBTI to the extent determined by the Internal Revenue Service (IRS) [Treas. Reg. §1.512(b)-1(a)].[2]

An Exempt Organization may also exclude from UBTI all gains and losses from the sale, exchange, or other disposition of property that is not (a) stock in trade or other property of a kind that would properly be included in inventory if on hand at the close of the taxable year or (b) property held primarily for sale to customers in the ordinary course of the trade or business (i.e., "dealer income") [Code sec. 512 (b)(5)]. The UBTI of an Exempt Organization does not therefore include capital gain income.

All gains or losses from the lapse or termination of options to buy or sell securities that are written by an Exempt Organization in connection with its investment activities may also be excluded from UBTI [Code sec. 512 (b)(5) and Treas. Reg. §1.512(b)-1(d)(2)].[3] An option is considered terminated when the Exempt Organization's obligation under the option ceases by any means other than exercise or lapse. This exclusion applies whether or not the Exempt Organization owns the property on which the option is written (i.e., whether or not the option is covered) [Treas. Reg. §1.512(b)–1(d)(2)].

Debt-Financed Income

Notwithstanding the general statutory and regulatory exclusions discussed above, UBTI specifically includes investment income and gains and losses from the sale, exchange, or other disposition of "debt-financed property," less any deductions directly connected with such property or the income therefrom [Code sec. 514(a)]. For this purpose, "debt-financed property" includes any property that is held to produce income, and with respect to which there is "acquisition indebtedness" at any time during the taxable year (or during the 12 months preceding disposition in the case of property disposed of during the taxable year) [Code sec. 514(b)(1)]. Acquisition indebtedness is the unpaid amount of indebtedness incurred by an Exempt Organization (a) in acquiring or improving debt-financed property; (b) before the acquisition or improvement of debt-financed property, if the indebtedness would not have been incurred but for the acquisition or improvement; or (c) after the acquisition or improvement of the debt-financed property, if the indebtedness would not have been incurred but for the acquisition or improvement and the indebtedness was "reasonably foreseeable" at the time of the acquisition or improvement [Code sec. 514 (c) (1)].[4]

Margin debt falls under the definition of acquisition indebtedness. UBTI therefore includes dividends, interest, and capital gains from securities purchased on margin. It also includes an Exempt Organization's distributive share of the investment income from leveraged investments made by a partnership in which the Exempt Organization is a partner [Code sec. 512(c)(1)].

Exempt Organizations generally seek to avoid UBTI by buying shares in offshore investment funds structured as corporations for U.S. federal income tax purposes. Because such offshore corporations are treated as separate entities for such tax purposes (rather than as "pass-through" entities such as partnerships), any indebtedness they incur in connection with their investment activities should not be attributed to the Exempt Organization. Therefore, dividends payable by an offshore corporation to the Exempt Organization, or any gains realized by the Exempt Organization's disposition or redemption of shares in such a corporation, should not result in UBTI [Code sec. 512 (b) (5)]. If, however, the Exempt Organization has incurred indebtedness in connection with its acquisition of the stock of the offshore investment fund, the investment income it receives from such investment corporation may constitute UBTI.

The offshore investment corporation will most likely constitute a "passive foreign investment company" (PFIC) for federal income tax purposes.[5] The special taxation rules applicable to PFICs generally do not result in making taxable any income that would otherwise be tax-exempt to an Exempt Organization.[6] If, however, the Exempt Organization has elected to treat the PFIC as a "qualified electing fund" (a QEF election), there is a risk that the IRS would assert that a flow-through approach should apply.[7] In that case, current income inclusions pursuant to the QEF election would result in UBTI to the extent that the PFIC purchases its securities on a leveraged basis.[8]

Short Sales

Does income derived by an Exempt Organization from the short sale of securities constitute debt-financed income taxable as UBTI? A short sale results in interest income earned on the cash proceeds held by the lender of the securities, and may result in a gain on the closing of the short sale. As discussed above, such investment income is excludable from UBTI unless the Exempt Organization incurs acquisition indebtedness with respect to the securities sold short. The key issue, therefore, is whether the obligation of the Exempt Organization to return the borrowed stock to the lender can be characterized as acquisition indebtedness, which could cause the income derived from the short sale to constitute debt-financed income.

Based on a published ruling issued by the IRS in 1995, it is clear that an Exempt Organization that borrows publicly traded stock to sell short does not incur acquisition indebtedness [*Revenue Ruling* 95-8, 1995-1 C.B. 107]. In this ruling, the IRS relied on the U. S. Supreme Court's determination that the borrowing of stock and the obligation of returning it to the lender does not give rise to indebtedness for purposes of the interest deduction.[9] The IRS reasoned that a short sale does not give rise to acquisition indebtedness within the meaning of Code section 514(b)(1) because a short sale creates an obligation but does not create indebtedness. As a consequence, neither an Exempt Organization's gain from closing out a short sale of publicly traded stock nor the rebate fee it receives from the lender's investment of the short sale proceeds constitutes UBTI.[10] It should be noted that the Exempt Organization that was the subject of the ruling engaged in the short sale as part of its investment strategy, with the purpose of earning a profit on the decline in value of stock sold short.

Since the issuance of *Revenue Ruling* 95-8, the IRS has issued a number of private letter rulings relating to Exempt Organizations' short sales of publicly traded stock.[11] These rulings confirm that short sales undertaken by an Exempt Organization as part of its investment strategy may be consistent with the organization's tax-exempt purpose, even if the Exempt Organization does not have a balanced (i.e., market neutral) portfolio of long and short positions. The rulings permit an Exempt Organization to post government securities or stock as collateral for its repayment obligations to the broker, provided that the collateral is not borrowed or purchased with borrowed funds. These rulings provide that the Exempt Organization may borrow the stock to be sold short from either the broker executing the short sale or a third party and, if the stock sold short declines in value, the broker may remit excess margin to the Exempt Organization in accordance with Regulation T and the broker's internal rules.[12]

Revenue Ruling 95-8 is notable for the analysis used by the IRS in reaching the conclusion that a short sale does not constitute acquisition indebtedness for purposes of Code section 514. By relying on the decision in *Deputy v. du Pont* [308 U.S. 488 (1940)], the IRS adopted the definition of indebtedness applicable for purposes of the deductibility of interest under Code section 163. This contrasts with the position taken by Congress for purposes of other statutory provisions of the Code. Thus certain Code sections treat substitute payments in short sales as interest expenses,[13] while another statutory provision treats short sales as giving rise to indebtedness.[14] These treatments reflect the effective similarity between short sales and borrowing money. This similarity is also reflected in two Revenue Rulings the IRS issued shortly after the publication of *Revenue Ruling* 95-8.[15] Nevertheless, the contrasting interpretive analysis contained in *Revenue Ruling* 95-8 remains applicable for purposes of short sales entered into by Exempt Organizations.

FOREIGN CORPORATIONS

A foreign corporation that is not engaged in a trade or business within the United States is subject to a 30% withholding tax (or such lower tax rate as may be applicable under an income tax treaty between the United States and the foreign country in which the foreign corporation is resident) on the gross amount of certain investment income treated as derived from sources within the United States [Code secs. 881(a) and 894]. For this purpose, a foreign corporation will not be treated as engaged in a U.S. trade or business merely because it invests and trades in securities and commodities for its own account through a broker located in the United States, regardless of whether the broker has discretionary trading authority with respect to the foreign corporation's account and regardless of the volume of trading activity [Code secs. 864(b)(2)(A)(ii) and (B)(ii) and Treas. Reg. §1.864-2(c)(2)].[16]

The following items of investment income are potentially subject to U.S. withholding tax:

(a) dividends paid by a U.S. corporation other than a corporation that has made a special election with respect to the taxation of income it derives from a U.S. possession (e.g., Puerto Rico) [Code secs. 861(a)(2)(A) and 881(a)(1)];[17]
(b) dividends paid by a foreign corporation that derives at least 25% of its gross income for a specified period from a trade or business within the United States [Code secs. 861(a)(2)(B) and 881(a)(1)];
(c) interest income received by a foreign bank on credit extended to a U.S. person pursuant to a loan agreement entered into in the ordinary course of the bank's trade or business [Code sec. 881(c)(3)(A)];
(d) interest income paid by a U.S. entity in which the foreign corporation has, either actually or constructively under specified stock attribution rules, at least a 10% equity interest [Code sec. 881(c)(3)(B)];
(e) certain interest income paid by a domestic corporation that is contingent in amount [Code sec. 881(c)(4)];
(f) interest income on debt instruments issued by U.S. persons or entities or foreign corporations engaged in a U.S. business (to the extent the interest is paid by such trade or business) on or before July 18, 1984 [Code secs. 881(a)(1) and (c) and 884(f)(1)(A)];
(g) original issue discount income accrued with respect to any bond or other evidence of indebtedness that has an original maturity of more than 183 days [Code sec. 871(g)] [18]; and
(h) interest income payable on certain debt instruments issued by a U.S. entity in bearer form, unless certain specific requirements are satisfied with respect to the issuance of the instrument so as to assure that the

instrument will not be acquired upon original issuance by U.S. persons [Code secs. 881(c)(2)(A) and 163(f)].

Foreign corporations that are not engaged in a trade or business within the United States are not subject to any U.S. withholding tax with respect to any income attributable to an NPC [Treas. Reg. §1.863-7(b)(1)].

Under current law, a foreign corporation is generally not subject to any U.S. federal income withholding taxes on capital gain income [Treas. Reg. §1.1441-2(b)(2)]. However, except as otherwise provided in an applicable tax treaty, a foreign corporation that is not engaged in any U.S. trade or business will be taxed (at the regular graduated tax rates applicable to domestic corporations) on any capital gains it derives from the sale or exchange of stock in a "U.S. real property holding corporation," except in the event that such stock is regularly traded on an established securities market and the foreign corporate seller owns no more than 5% of such stock [Code secs. 897(a), (c)(2), and (c)(3)].[19] A "U.S. real property holding corporation" is any corporation whose U.S. real property interests have a fair market value equal to at least 50% of the aggregate fair market value of the sum of its U.S. real property interests, its interests in real property located outside the United States, and any other of its assets used or held for use in a trade or business [Code sec. 897(c)(2)].

For a foreign corporation not engaged in a U.S. trade or business, special rules apply in determining the federal taxation of income derived from its investments in a "real estate investment trust" that is regularly traded on an established securities exchange[20] (i.e., a Publicly Traded REIT). The following discussion assumes that no more than five individuals, or Exempt Organizations, collectively own more than 50% of the aggregate value of the shares of the Publicly Traded REIT (the REIT shares) at any time.

A foreign corporation (except as otherwise provided by an applicable income tax treaty) is subject to a 30% U.S. withholding tax on Publicly Traded REIT distributions that are attributable to interest paid pursuant to mortgages of domestic borrowers or rent from U.S. real property and that do not exceed the current and accumulated earnings and profits of the Publicly Traded REIT. To the extent that distributions exceed current and accumulated earnings and profits, such distributions are treated as nontaxable returns of capital to the foreign corporation, up to an amount equal to its tax basis in the REIT shares; distributions in excess of this amount ("excess distributions") are treated as amounts received in exchange for the foreign corporation's REIT shares [Code secs. 301, 312, 316]. Excess distributions are not subject to any U.S. withholding tax if either (a) U.S. persons or entities hold, directly or indirectly, at least 50%

of the fair market value of the REIT's outstanding shares (a "domestically controlled REIT") during the five-year period ending on the date of the excess distributions (or such shorter period as the Publicly Traded REIT is in existence) [Code sec. 897(h)(4)(B) and Treas. Reg. §1.897-1(c)(2)(iii)] or (b) the foreign corporation does not own (actually or constructively after the application of specified stock attribution rules) more than 5% of the outstanding REIT shares [Code secs. 897(c)(3) and 897(c)(6)(C) and Treas. Reg. §1.897-1(c)(2)(iii)].

Distributions to a foreign corporation that are attributable to gains from a Publicly Traded REIT's disposition of interests in U.S. real property are taxed as though the corporation was engaged in a trade or business within the United States and the distributions constituted income effectively connected with such trade or business ("effectively connected income") [Code secs. 897(a) and 897(h)(1)]. Effectively connected income is subject to U.S. federal income taxation at the regular graduated tax rates generally applicable to domestic corporations. The Publicly Traded REIT is required to withhold a tax equal to 35% of the amount of all capital gain distributions paid to the foreign corporation [Treas. Reg. §1.1445-8(c)(2)]. The foreign corporation is required to file a U.S. federal income tax return reflecting its effectively connected income from the Publicly Traded REIT and claiming a credit for the U.S. taxes withheld by the Publicly Traded REIT.

Gains derived by a foreign corporation from its sale of Publicly Traded REIT shares are not subject to U.S. federal income or withholding taxes if either (a) the Publicly Traded REIT constitutes a domestically controlled REIT [Code sec. 897(h)(2)] or (b) the foreign corporation does not own (actually or constructively after the application of certain stock attribution rules) more than 5% of the aggregate outstanding REIT shares [Code sec. 897(c)(3)].

Foreign Corporations Engaged in a U.S. Business

For foreign corporations engaged in trade or business within the United States, effectively connected income is subject to federal income taxation at the same graduated tax rates applicable to domestic corporations [Code sec. 882(a)]. Investment income and capital gain income derived from sources within the United States constitute effectively connected income if either (a) the income is derived from assets used or held for use in the conduct of the corporation's U.S. business or (b) the activities of such business were a "material factor" in the realization of such income.[21] In making this determination, due regard is given to whether the asset or income was accounted for through the foreign corporation's U.S. business [Code sec. 864(c)(2)].

Dividends, capital gains, or interest income derived by a foreign corporation from sources outside the United States will constitute effectively connected income only if (a) the corporation's principal business is trading in securities for its own account and (b) the corporation has an "office or fixed place of business" in the United States to which the income is "attributable" [Code sec. 864(c)(4)]. Income will be treated as "attributable" to such office or place of business only if the office or business is a material factor in the realization of the income and regularly carries on activities of the type from which such foreign source income is derived [Code sec. 864(c)(5)(B)]. The U.S. office or fixed place of business will constitute a "material factor" for purposes of this test if it either (a) actively participates in soliciting, negotiating, or performing other activities required to arrange the issue, acquisition, sale, or exchange of the asset from which such income is derived or (b) performs significant related services [Code sec. 864(c)(5)(B) and Treas. Reg. §1.864-6(b)(2)(ii)].[22]

MUTUAL FUNDS

A domestic corporation or trust qualifying as a "regulated investment company" (RIC) for federal income tax purposes generally is not subject to federal income taxation on its "investment company taxable income" and capital gain income that is distributed (or deemed distributed) as dividends to its shareholders [Code sec. 852(b)(1)]. In order to qualify as an RIC, a domestic corporation or a trust must generally (a) be registered under the Investment Company Act of 1940 (the 1940 Act) as a management company, a business development company, or a unit investment trust [Code sec. 851(a)(1)(A)]; (b) have elected to be treated as such for the taxable year involved [Code sec. 851(a)(1)]; and (c) satisfy specific asset diversification, income, and distribution requirements [Code secs. 851(b)(2) and (b)(3) and 852(a)].

A domestic corporation can qualify as an RIC with respect to a taxable year only if at least 90% of its gross income for the year is derived from dividends, interest, payments with respect to securities loans, gains from the sale or other disposition of stock or "securities" (as defined for purposes of the 1940 Act) [Code sec. 851(c)(5)] or foreign currencies, or from other income (including gains from options, futures, and forward contracts) derived from its business of investing in such stocks, securities, or currencies [Code sec. 851(b)(2)]. For purposes of this income test, otherwise tax-exempt interest income from state and local municipal obligations is included in the corporation's gross income, and income from an interest in a partnership or trust will have the same character as if the corporation had earned this income directly in the same manner as realized by the partnership or trust [Code sec. 851(b)]. Income derived by an RIC from market neutral investment strategies should therefore constitute qualifying income for purposes of applying this income qualification test.

For taxable years beginning on or before August 5, 1997, a corporation could not have qualified as an RIC if 30% or more of its gross income came from the disposition of securities, options, futures, or forward contracts (other than options, futures, or forward contracts in foreign currencies) that had been held by the corporation for less than three months. Congress repealed this "short-short" rule after determining that it limited an RIC's ability to hedge its investments against adverse market moves and unnecessarily burdened RICs with significant recordkeeping and administrative costs.

A domestic corporation can qualify as an RIC with respect to a taxable year only if the corporation also maintains a diversified investment portfolio. Such a portfolio must satisfy the following tests at the close of each quarter of the corporation's taxable year. First, at least 50% of the corporation's assets must be invested in cash and cash items (including receivables), U.S. government securities, securities of other RICs, and other securities (provided the RIC's share of those securities does not exceed 5% of the aggregate value of the issuing corporation's shares and does not constitute more than 10% of the voting securities of the corporation).[23] Second, the RIC cannot invest more than 25% of the value of its assets in the securities of any one issuer (other than government securities or securities of other RICs) or in the securities of any two or more issuers if the RIC controls at least 20% of the issuers and they are engaged in the same, a similar, or a related trade or business [Code secs. 852(b)(3) and 851(c)(2)]. This diversification requirement can only be violated by the RIC's acquisition or disposition of securities (in which case there is a 30-day period in which the RIC can address such violations). Fluctuations in the market value of an RIC's portfolio securities will not result in violations of the diversification requirements [Code sec. 851(d)].

Finally, a domestic corporation can qualify as an RIC for a taxable year only if it meets the following additional requirements. First, with respect to that year, it must distribute to its shareholders as dividends an amount equal to 90% of its dividend and interest income for the year (exclusive of capital gains distributions) [Code secs. 852(a)(1) and (2)]. Second, it must either meet all the RIC provisions for all tax years ending on or after November 8, 1983 or it must, as of the close of the taxable year, have no earnings or profits accumulated in any taxable year in which it did not qualify as an RIC.

An RIC is subject to a 4%, nondeductible excise tax for any year in which it fails to distribute at least 98% of its ordinary income and at least 98% of its capital gains income [Code sec. 4982(b)(1)]. For purposes of this test, capital gains income is measured for the 12-month period ending October 31 of any calendar year [Code sec. 4982(e)(2)]. The excise tax is imposed on any difference between these required distributions and actual distributions, including amounts taxed at the RIC level (e.g., undistributed capital gains) [Code sec. 4982(c)(1)(B)].

ERISA REQUIREMENTS

In 1986, the U.S. Department of Labor (DOL) issued a regulation that describes the circumstances under which the manager or general partner of a private investment fund is subject to the fiduciary responsibility rules of ERISA [DOL Reg. §2510.3-101]. Under the so-called "Plan Assets Regulation," a pension plan subject to ERISA is deemed to have an undivided interest in the assets of a private investment fund in which it is invested, and the manager of the fund will be an ERISA fiduciary if the fund has a "significant participation" by benefit plan investors. The fund manager will also be an ERISA fiduciary if it acts as the investment manager to an ERISA client in a managed account structure.

In order to determine whether or not a fund has "significant participation" by benefit plan investors, a fund manager must be able to identify whether its investors are benefit plan investors. Under the Plan Assets Regulation, all retirement, pension, profit-sharing, money purchase, and 401(k) plans are benefit plan investors, whether or not subject to ERISA; this would include typical corporate pension plans, government plans, non-qualified plans, and plans of foreign corporations. All individual retirement accounts or Keogh plans, as well as investments made by trusts, other funds, and insurance company separate accounts that are comprised of plan assets, are also benefit plan investors.

The Plan Assets Regulation provides that significant participation occurs whenever 25% or more of the value of any class of equity interest in the fund is held by benefit plan investors. For the purposes of calculating this 25% test, the value of any equity interests held by the fund manager, its employees, and its affiliates (although not plans, such as IRAs, benefiting such persons) are disregarded. Significant participation must be tested each time there is an acquisition, disposition, or redemption of an equity interest in the fund.

During any period in which the fund has significant participation by benefit plan investors, the fund manager will be a fiduciary with respect to each plan that has invested in the fund. The consequences of being an ERISA fiduciary are twofold. First, ERISA imposes various fiduciary duties and reporting obligations on the fund manager. Second, ERISA prohibits certain transactions between so-called "parties-in-interest" to each plan investor and the fund. In order to avoid becoming an ERISA fiduciary, many market neutral partnerships seek to keep benefit plan investor participation under 25%. The remainder of this section assumes that the fund is subject to ERISA.

Investment Manager Status

It is likely that the investing plan's fiduciaries will require the fund manager to accept and acknowledge its status as a fiduciary to the plan and to represent that it is registered with the Securities and Exchange Commission (SEC) as an investment adviser under the 1940 Act. Alternatively, if the fund manager does not meet the qualifications to register with the SEC, it is likely that the fund manager will be asked to represent that it is unable to register with the SEC but is registered as an investment adviser with a state and has submitted this state registration to the DOL.

The fund manager will then be an investment manager under Section 3(38) of ERISA. The investing plan's fiduciaries will thus not be directly liable for any ERISA violations committed by the fund manager. Of course, the fund manager will be an ERISA fiduciary whether or not it meets the necessary criteria or makes such representations.

General Fiduciary Duties

ERISA requires that a plan's assets be invested prudently and that they be diversified to avoid the risk of large losses [ERISA sec. 404(a)(1)]. When a fiduciary has investment authority over only a portion of a plan's assets, these requirements apply only to the portion of the plan's portfolio under that fiduciary's control [DOL Reg. §2550.404a-1].

ERISA's prudence requirement is based on the premise that an investment that is reasonably designed as part of a portfolio to further the purposes of the plan, and that is made after appropriate consideration of the surrounding facts and circumstances, will not be deemed to be imprudent merely because the investment standing alone would have a high degree of risk [preamble to DOL Reg. §2550.404a-1]. If a fund manager invests its assets in a manner consistent with the investment strategy described in the fund's offering materials, and with the care, skill, prudence, and diligence that other professional fund managers employ, the fact that the fund employs an investment strategy that includes the use of short sales will not in and of itself result in a breach of the fund manager's duties of prudence.

Similarly, ERISA's requirement that a plan's assets be diversified is not determined in isolation. If a fund manager diversifies its portfolio within the parameters described in the offering materials, the fact that the fund has a limited investment style will not result in a breach of the fund manager's duty to diversify. However, if a large percentage of a plan's assets is invested in a single fund, the fund manager may have to take into account the overall diversification and cash flow needs of the plan. For this reason, it may be advisable for the fund to limit the percentage of a single plan's assets that can be invested in the fund.

ERISA also requires that a fiduciary act with the exclusive purpose of providing benefits to the plan's participants and their beneficiaries. It prohibits a fiduciary from engaging in transactions wherein its duty to the plan may be compromised by its own interests, or by its duties to another party [ERISA secs. 404(a)(1) and 406(b)]. Certain arrangements that are customary in market neutral investing may thus be proscribed for market neutral fund managers that are ERISA fiduciaries. For example, borrowing securities from an affiliated broker-dealer to enter into a short sale is prohibited, as is hiring and paying an affiliate for performing services, even if those services are necessary and the compensation is reasonable.

ERISA requires that the fees paid to an ERISA fiduciary be reasonable with respect to the services performed [ERISA sec. 408(b)]. This requirement is generally not an issue, provided that an independent plan fiduciary agrees to the management fee outlined in the fund's offering materials and the fee is the same as other sophisticated, independent investors in the fund have agreed to pay.

Some questions have arisen regarding performance fee or incentive allocations. In particular, not entirely resolved is whether charging a performance or incentive fee permits an ERISA fiduciary to determine the amount or timing of its compensation. A fiduciary that controls the amount or timing of its fees will generally be considered to have engaged in a prohibited act of self-dealing. However, in four advisory opinions, the DOL has advised that the receipt of a performance fee or incentive allocation will not automatically result in a prohibited transaction.[24] These opinions generally provide that an ERISA fiduciary can be compensated through a performance fee or incentive allocation if the following requirements are met:

(a) the decision to invest in the fund and to pay the performance fee or incentive allocation is made by an independent plan fiduciary;
(b) the independent plan fiduciary is a sophisticated investor and represents that it fully understands the formula for calculating the perfor-

mance fee or incentive allocation and the risks associated with such arrangement;

(c) the independent plan fiduciary can withdraw from the fund on reasonably short notice;

(d) the performance fee or incentive allocation complies with the terms of Rule 205-3 of the 1940 Act;

(e) the performance fee or incentive allocation is based on annual performance, taking into account both realized and unrealized gains and losses, and upon withdrawal from the fund, net profit is determined through the date of withdrawal; and

(f) the fund invests in securities for which independent market valuations are readily available, or securities are valued by a qualified party independent of the fund manager and approved by the independent plan fiduciary.[25]

A fund manager using an affiliated broker to execute its trades can affect the amount or timing of its compensation, and may thereby be perceived as violating ERISA fiduciary standards. However, the DOL has issued a class exemption, Prohibited Transaction Exemption PTE 86-128, that permits a fund manager to use an affiliated broker and have the brokerage firm retain commissions for executing these trades. In order to obtain the relief provided by this exemption, the fund manager must:

(a) obtain from each investing plan fiduciary prior and continuing authorization to use an affiliate to execute trades;

(b) provide each investing plan fiduciary with a description of the fund manager's brokerage practices and any other information requested;

(c) provide any investing plan with the opportunity to withdraw from the fund without penalty within such time as may be necessary to effect the withdrawal in an orderly manner equitable to all investors in the fund;

(d) provide each investing plan fiduciary with quarterly reports disclosing the particulars of each trade executed by the fund manager's affiliate, the total brokerage fees paid by the fund during the quarter, and the amount of such brokerage fees paid to affiliated and nonaffiliated persons; and

(e) provide each investing plan fiduciary with an annual report disclosing the total of all brokerage fees paid by the fund during the year, the total of such brokerage fees paid to affiliated and nonaffiliated persons, an updated description of the fund's brokerage practices if they changed during the year, and the annual portfolio turnover ratio calculated to disclose any churning of funds.

Under ERISA, a fund manager is not prohibited from utilizing soft dollars (e.g., research and related services), provided soft dollars are permitted under Rule 28(e) of the Securities Exchange Act of 1934, as amended. In general, Rule 28(e) permits the use of soft dollars from brokerage firms, provided best execution is obtained. The DOL has stated in Technical Release 86-1 that the use of soft dollars covered by Rule 28(e) will not be prohibited under ERISA.

ERISA Bonding

In addition to complying with ERISA's fiduciary duties, a fund manager must be covered by an ERISA bond [ERISA sec. 412]. With respect to any plan investors, the fund manager must either purchase its own bond equal to the lesser of 10% of the plan's investment or $500,000, or must be covered by each plan investor's existing ERISA bond. In addition, fund managers may find it advisable to review their directors' and officers' liability insurance policy with respect to coverage for any breaches of their fiduciary duties under ERISA.

ERISA Reporting

ERISA requires that most plans file an annual report (Form 5500) with the DOL [ERISA sec. 103]. Form 5500 provides a detailed financial report of a plan for the year involved. If a plan has over 100 participants, the Form 5500 includes a report from an independent qualified public accountant. Each plan acquiring an interest in a fund that is subject to ERISA fiduciary requirements is required to include all of the fund's assets, liabilities, and expenses on its Form 5500.

To ease this reporting burden, the DOL has issued a regulation providing an alternative method of reporting for plans investing in look-through entities [DOL reg. §2520.103-12]. Under this alternative method of compliance, a plan would only be required to report the current value (at the beginning and end of the plan year) of its interest in the fund on its Form 5500. For a plan investor to be eligible for this alternative reporting method, the relevant fund must itself file a Form 5500 with the DOL containing information about the fund, including its assets, liabilities, and expenses, a list of the plan investors in the fund, and a report of an independent qualified accountant regarding the information provided.

ERISA Prohibited Transactions

ERISA prohibits any transactions between a plan (or with plan assets) and any "party-in-interest" to the plan [ERISA sec. 406(a)]. The definition of a "party-in-interest" is so broad that it is generally impossible to obtain, update, and confirm that each transaction made by a fund is with a party that is not a party-in-interest. For example, the parties-in-interest to a plan include all its fiduciaries, service providers, and employees, as well as certain relatives and affiliates of such persons, the employer sponsoring the plan, and all members of the employer's controlled group [ERISA sec. 3(14)].

Three exceptions to the prohibited transaction rules permit a fund subject to ERISA fiduciary standards to conduct its normal business operations. First, the legislative history of ERISA provides that the purchase or sale of securities on a national securities exchange in an ordinary blind transaction, where neither the buyer nor the seller knows the identity of the other party, will not be a prohibited transaction. Although the legislative history also covers the purchase/sale of bonds, convertibles, and other debt securities, it does not cover the underlying extension of credit, which may be prohibited if it is made to a party-in-interest. For this reason, managers whose investment strategy involves debt securities often rely on the QPAM exemption discussed below [Conference Committee Explanation (P.L. 93-406)].

Second, a DOL class exemption, Prohibited Transaction Exemption PTE 84-14, provides that a fund manager that meets the criteria for a qualified professional asset manager (QPAM) can engage in transactions with certain parties-in-interest with respect to a plan that invests in the fund. To be a QPAM, the fund manager must (a) be an investment adviser registered with the SEC under the 1940 Act; (b) acknowledge to each plan investor that it is acting as a fiduciary with respect to any plan assets in the fund; and (c) have at least $50,000,000 in assets under management and $750,000 in equity capital as of the last day of its most recently completed fiscal year.[26]

The QPAM exemption permits a fund to transact with any party-in-interest to a plan investor other than a party that is affiliated with the fund manager itself; a party that has the authority (or within the past year had the authority) to invest in the fund, add to that investment, or withdraw assets from the fund; or a party-in-interest to a plan whose investment in the fund is equal to or greater than 20% of total client assets managed by the fund manager.

Third, another DOL class exemption, Prohibited Transaction Exemption PTE 75-1 enables the fund to engage in short sales—an inherent part of market neutral strategies. As discussed previously, while ERISA does not prohibit the use of short sales, ERISA does prohibit the extension of credit between a plan and a party-in-interest. Because the securities borrowed to engage in a short sale will usually be supplied by a broker or dealer that also performs normal brokerage services for the fund, that broker or dealer could be a service provider to the fund and thereby a party-in-interest with respect to plan investors. PTE 75-1 provides an exemption from the prohibited transaction rules for an extension of credit made in connection with the borrowing of securities to enter into a short sale. It requires that certain conditions be satisfied. Most significant of these conditions is the requirement that no interest or other compensation can be paid for the loan of the securities if the lender of the securities is an affiliate of the fund manager.

CONCLUSION

Exempt Organizations, foreign corporations, and RICs should be aware of certain tax implications of market neutral investment. These investors generally will not be subject to taxes on the investment income they derive from such strategies, although certain exceptions do exist.

The manager of a market neutral fund may or may not be subject to ERISA fiduciary standards. A manager that has "significant participation" by plans or entities that are themselves subject to ERISA will be considered an ERISA fiduciary. As such, the manager will be subject to ERISA standards of care, prudence, and diligence. Furthermore, ERISA standards may govern the manner in which such a manager uses performance or incentive fees, the manager's use of an affiliated broker to execute trades, the use of soft dollars, and reporting requirements.

In general, there are no significant regulatory impediments to market neutral investing by a wide class of tax-exempt investors or special categories of investors.

NOTES

[1] Further, this UBTI exclusion applies only if the agreement pursuant to which the securities are transferred to the borrower contains provisions requiring: (a) the return of the identical securities to the Exempt Organization upon the loan termination; (b) payments to the Exempt Organization of amounts equal to all interest, dividends, and other distributions that the owner of the securities is entitled to receive during the period beginning with the transfer of securities and ending with the transfer of identical securities back to the Exempt Organization; (c) reasonable procedures to implement the obligation of the borrower to continually furnish to the Exempt Organization collateral with a fair market value equal to at least the fair market value of the security at the close of business on the preceding business day; and (d) the termination of the loan by the Exempt Organization upon notice of not more than five business days [Code secs. 512(a)(5)(B) and 1058(b)].

[2] The Internal Revenue Service intends the phrase "ordinary and routine" to mean investments that are ordinarily and routinely engaged in by investors in capital, com-

modity, and similar financial markets, even though the Exempt Organization itself does not ordinarily and routinely engage in such transactions [preamble to T.D. 8423, July 28, 1992]. To date, the IRS has not issued any further guidance with respect to the scope of this regulatory exception.

3 For example, this exclusion does not apply if the Exempt Organization is engaged in the trade or business of writing options (whether or not the Exempt Organization owns the securities upon which the options are written) [Treas. Reg. §1.512(b)-1(d)(2)].

4 To constitute acquisition indebtedness there clearly must be a connection between the incurrence of debt and the acquisition of property. In addition to the required connection between the indebtedness and the property, a foreseeability requirement is imposed when indebtedness is incurred *after* the acquisition or improvement of property. The test for determining whether incurring indebtedness is reasonably foreseeable at the time property is acquired or improved is a facts and circumstances test. The fact that an Exempt Organization did not actually foresee the need for the incurrence of the indebtedness does not necessarily mean that its incurrence was not reasonably foreseeable at the time the property was acquired or improved [Treas. Reg. §1.514(c)-1(a)(1)].

5 A foreign corporation will constitute a PFIC with respect to a taxable year if either (a) at least 75% of its gross income for the year consists of passive income (e.g., dividends, interest, net capital gains, net foreign currency gains, and any income equivalent to interest) or (b) at least 50% of its assets produce, or are held for the production of, passive income [Code secs. 1297(a) and 954(c)].

6 A proposed Treasury regulation [Prop. Treas. Reg. §1.1291-1(e)] provides that if a shareholder of a PFIC is an Exempt Organization, Code section 1291 and the Treasury regulations thereunder apply to such a shareholder only if a dividend from the PFIC would be taxable to the Exempt Organization under the UBTI rules. However, as discussed above, dividend income from a non-debt-financed investment in a corporation is excludible from UBTI.

7 U.S. persons and entities owning shares in a PFIC are generally subject to a special U.S. federal income tax regime with respect to certain distributions received from the PFIC and with respect to gain from the sale or disposition of stock in the PFIC. Different rules apply depending on whether the U.S. shareholder has made a QEF election for the first taxable year that it owns the PFIC stock. If a QEF election is made, the U.S. shareholder must report as income each year its pro rata share of the PFIC's realized net ordinary income and realized capital gains for the year [Code sec. 1293(a)]. If a QEF election is not made, the U.S. shareholder must generally pay a special tax and an interest charge (based on the value of tax deferral) on the gain recognized on direct and indirect dispositions of stock in the PFIC and upon the receipt of an excess distribution from the PFIC (i.e., a distribution representing amounts received during the current year in excess of 125% of the average amounts of distributions received by the shareholders in the preceding three years) [Code secs. 1291(a), (b), and (c)].

8 Under proposed Treasury regulations, amounts included in gross income under a QEF election are not treated as distributions by the PFIC [Prop. Treas. Reg. §§1.1291-1(c)(1) and -2(b)(2)]. Therefore, if an Exempt Organization has made a QEF election with respect to a PFIC, the Exempt Organization cannot rely on the rule discussed in Proposed Treasury Regulation §1.1291-1(e).

[9] In *Deputy v. du Pont*, 308 U.S. 488 (1940), the Supreme Court stated that "although an indebtedness is an obligation, an obligation is not necessarily an 'indebtedness.'"

[10] The facts of this ruling involved an Exempt Organization that sold shares of publicly traded stock that it borrowed from its broker. The broker retained the proceeds of the short sale and income therefrom as collateral for the Exempt Organization's obligation to return the borrowed shares and the Exempt Organization deposited additional cash from its own (not borrowed) funds with the lender as additional collateral. Since the ruling only involved a short sale of publicly traded stock, the IRS expressly stated that its ruling does not provide any inference with respect to short sales involving other property.

[11] While private letter rulings are issued to a specific taxpayer and cannot be used or cited as precedent by another taxpayer, such rulings do provide helpful insight into the views of the IRS on particular issues [Code sec. 6110(j)(3)]. Further, private letter rulings are considered authority for purposes of determining if a taxpayer has "substantial authority" for its position with respect to the imposition of the accuracy-related penalty provisions under Code section 6662 [Treas. Reg. §1.6662-4(d)(3)(iii)].

[12] See, for example, Private Letter Rulings 9637053, 9642051, and 9703027. Further, Private Letter Ruling 9642051 concludes that acquisition indebtedness does not arise for purposes of Code section 514 by reason of the Exempt Organization's furnishing of collateral in connection with the borrowing of stock and the maintenance of related deposit accounts with a broker serving as custodian of the collateral.

[13] See, for example, Code section 163(d)(3)(C), which treats any amount allowable as a deduction in connection with personal property used in a short sale as interest expense for purposes of the deductibility limitations applicable to investment interest expenses; Code section 263(g), which defines the term "interest" to include any amount paid or incurred in connection with personal property used in a short sale; and Code section 265(a)(5), which provides that the term "interest" generally includes amounts paid or incurred by any persons making a short sale in connection with personal property used in such short sale or by any other person for the use of any collateral with respect to such short sale.

[14] Code section 246A(d)(3)(B) (which reduces the dividends-received deduction for dividends paid in stock financed with portfolio indebtedness) provides that any amount received from a short sale is treated as indebtedness for purposes of that statutory provision.

[15] *Revenue Ruling* 95-26, 1995-1 C.B. 131 and *Revenue Ruling* 95-45, 1995-1 C.B. 53, both rely on the holding in *Deputy v. du Pont* in interpreting the term "liability" to include an obligation to return borrowed shares in connection with a short sale. *Revenue Ruling* 95-26 analyzes the effect of a short sale by a partnership on the tax bases of its partners in their interests in the partnership. This ruling concludes that a short sale constitutes a liability for purposes of Code section 752. A similar holding is found in *Revenue Ruling* 95-45 to support its holding that a short sale gives rise to a liability for purposes of sections 357 and 358.

[16] Prior to 1998, this statutory safe harbor exemption from "trade or business status" did not apply if the foreign corporation's "principal office" was deemed to be in the United States. The then applicable Treasury regulations provided that a foreign corporation would not be treated as having a principal office in the United States if the

corporation maintained a general business office outside of the United States and "all or substantially all" of 10 specifically enumerated factors relating to the corporation's administration or operations were conducted outside of the United States [Treas. Reg. §1.864-2(c)(2)(iii)]. Since the repeal of this "principal office" requirement, foreign investment funds are able to conduct a wide range of business activities within the United States without being treated as engaged in a U.S. trade or business.

[17] U.S. source dividends paid to foreign investors do not constitute "qualified dividend income" eligible for taxation at net capital gains rates under the Jobs and Growth Tax Relief Reconciliation Act of 2003. Withholding agents must therefore continue to withhold a 30% U.S. tax (or such lower rate as provided by an applicable tax treaty) on such payments.

[18] In this case, the tax withheld is limited to the tax on the amount of original issue discount accrued since the last payment of interest, but cannot exceed the actual interest payment made on the indebtedness less the U.S. withholding tax imposed thereon [Code sec. 881(a)(3)(B)].

[19] Subject to certain exemptions, any such gains will be subject to a special U.S. withholding tax equal to 10% of the amount realized by the foreign corporation on such sale or exchange [Code sec. 1445(a)].

[20] The shares of a REIT will be considered to be "regularly traded" for any calendar quarter if (a) trades in such shares are effected other than in de minimis quantities on at least 15 days during the calendar quarter; (b) the aggregate number of the interests in such traded shares is at least 7.5% of the average number of interests in the shares outstanding during the quarter; and (c) 100 or fewer unrelated persons own less than 50% of the outstanding shares computed in accordance with certain stock attribution rules [Treas. Reg. §1.897-9T(d)(1)].

[21] For example, assume a foreign corporation is engaged in industrial manufacturing and maintains a branch office in the United States whose activities cause it to be treated as engaged in a U.S. trade or business for federal income tax purposes. The branch office is required to hold a large current cash balance for business purposes, but the amount of the required cash balance varies because of the fluctuating seasonal nature of the branch's business. At a time when large cash balances are not required, the branch invests the surplus amount in U.S. Treasury bills. Since the Treasury bills are held to meet the present needs of the branch's business, the interest income on these bills is effectively connected income [Treas. Reg. §1.864-4(c)(2)(v), Ex. 1].

Further, assume a foreign corporation maintains a branch office in the United States, which acts as an importer and distributor of merchandise and is thereby engaged in a U.S. trade or business for tax purposes. The foreign corporation also carries on a business in which it licenses patents to unrelated persons in the United States for use in the United States. The businesses of the licensees in which these patents are used are related to the business carried on by the foreign corporation's U.S. branch office. The negotiations and other activities involved in the consummation of the licenses are conducted principally by employees of the branch office. The royalties received by the foreign corporation from these licenses should constitute effectively connected income because the activities of the foreign corporation's U.S. branch office are a material factor in the realization of this income.

[22] For example, assume a foreign corporation engaged in the business of manufacturing and selling merchandise throughout the world maintains a branch office in the

United States which is responsible for sales of merchandise to U.S. customers and for the investment of the assets of this office. The branch office invests its excess cash in the securities of various foreign corporations, which produce dividend and interest income from foreign sources. If the employees of the branch office actively participate in the acquisition of these foreign securities, the dividend and interest income thereon will constitute effectively connected income to the foreign corporation.

An office or fixed place of business in the United States is not considered a "material factor" in the realization of foreign source dividend, interest, or capital gains income merely because such office or other fixed place of business conducts one or more of the following activities: (a) collects or accounts for the income; (b) exercises general supervision over the activities of the persons directly carrying on the activities or services described in the text; (c) performs merely clerical functions incidental to the issuance, acquisition, sale, or exchange; or (d) exercises final approval over the execution of the issuance, acquisition, sale, or exchange [Treas. Reg. §1.864-6(b)(2)(ii)].

[23] The IRS has ruled that futures contracts on securities issued by the Government National Mortgage Association are "U.S. government securities" [General Counsel Memorandum 39447 (Dec. 5, 1984) and Private Letter Rulings 8640059 and 8548016].

[24] U.S. Department of Labor Advisory Opinions: 86-20A (BDN Advisers, Inc.); 86-21A (Batterymarch Financial Management); 86-31A (Alliance Capital Management L.P.); 89-31A (Mount Lucas Management Corporation).

[25] A recent Eighth Circuit Court of Appeals case held that a fund manager that valued securities upon which its fee was based did not violate ERISA so long as the overall fee was reasonable [*Harley v. Minnesota Mining and Manufacturing Co.*, 284 F.3d 901 (8th Cir. 2002)].

[26] The DOL has proposed amending PTE 84-14 to update the 20-year-old exemption; one of the proposed changes is to increase the monetary requirements for assets under management to $85 million and for equity capital to $1 million.

CHAPTER 12

Afterword

Bruce I. Jacobs, Ph.D.
Principal
Jacobs Levy Equity Management

Kenneth N. Levy, CFA
Principal
Jacobs Levy Equity Management

Chapter 2 of this book presented questions and answers meant to introduce readers to some of the concepts behind market neutral investing. We end the book with some particular questions interested investors might ask prospective market neutral managers in order to help assure themselves of the suitability of the investment. A good jumping-off point is disclosure, because that can be a quick and easy determinant of suitability.

Is the level and frequency of disclosure adequate for you to assess the strategy—particularly the risk the manager is taking to provide the anticipated value-added? Historically, of course, many market neutral strategies were accessed via hedge funds, which had notoriously poor disclosure.[1] Today, such strategies are increasingly being offered by managers subject to disclosure requirements geared to institutional investors. Furthermore, hedge funds have had to become more forthcoming and more transparent about their own workings in order to attract institutional investors.

It is not necessary to know (nor is one likely to obtain) every position in the portfolio. In fact, as the history of Long-Term Capital Management (LTCM) demonstrates, too much transparency can be counterproductive. When counterparties and other market participants become aware of a fund's trading strategy, they may take advantage of that knowledge, trading in ways that damage the fund's value.

At the other extreme, knowing only the historical or expected returns and standard deviations of the portfolio may not be very helpful. Many market neutral portfolios have nonnormal return distributions, reflecting the presence of options and option-like positions. Simple measures of return and variance and calculations based on such measures, including mean-variance analysis and value-at-risk (VAR), may tend to underestimate risks and overestimate returns.[2]

Given a market neutral portfolio's simple historical risk-adjusted returns, however, one may want to look for the following warning signals. *Are the risk-adjusted returns suspiciously high?* As Askin Capital Management (ACM) and LTCM showed, some market neutral strategies behave very similarly to short option trades: they tend to experience good returns with suspiciously little risk for some period, and then "implode" as the result of an unanticipated event.[3] *Do returns exhibit serial correlation over time?* When portfolio holdings are illiquid and difficult to value, managers may be tempted to value portfolio holdings in such a way as to "smooth" performance and lower volatility. Serial correlation of returns may thus reflect portfolio illiquidity and manager manipulation.[4]

What is the portfolio's historical or expected return on assets? Return on equity may not be a good indication of performance if the strategy is highly leveraged. LTCM boasted a phenomenal return on equity, even as its return on assets was as low as a few cents on the dollar.

If the strategy is leveraged, is the level reasonable? Certain strategies and certain managers may be subject to regulatory control of leverage. The U.S. Federal Reserve Board's Regulation T, for example, controls the amount of leverage most investors can use when investing in U.S. common stocks and convertible bonds. These limits do not apply to instruments such as government and municipal bonds, and are often circumvented by hedge funds, but individual brokers and exchanges, as well as lending counterparties such as banks, may impose their own limits, which may be more restrictive than government controls. In the era before LTCM, there was some perception on the part of investors (and regulatory authorities) that lending institutions would provide prudent control of leverage. But the LTCM debacle proved lenders as susceptible as any other investor to greed in exuberant markets. While banks did decrease lending activities in the wake of 1998, and have boasted new risk management systems to monitor borrowers, it seems unreasonable to rely on lenders to police leverage. Furthermore, leverage can be achieved via derivatives, which may lie outside regulated areas of the financial markets.

If the strategy is leveraged, what form does the leverage take—borrowing, repo positions, margined instruments (including derivatives)? For borrowing and repo positions (and short equity positions), lenders are generally fully collateralized. However, if the value of the collateral declines, the borrower may face an unexpected demand for funds, as lenders ask for more collateral or even raise haircuts. (Similarly, if demand to short a particular stock reaches a very high level, the lender may eliminate the short rebate or even charge interest to lend the stock.) *What plans has the fund made for such eventualities?*

Is leverage achieved via derivatives? Some strategies may require derivatives to reduce portfolio risk. In mortgage arbitrage, for example, options may be required to create market neutrality. Other strategies, such as market neutral equity, may use derivatives to establish a desired asset class exposure. But derivatives can introduce market risks, credit risks, and model risks that may be difficult to measure.[5] The portfolio that includes derivatives, for example, may face unexpected demands for funds to meet marks to market or margin calls. In addition, with over-the-counter instruments, the portfolio incurs counterparty credit risk—the risk that the counterparty to the contract may fail to meet its marks to market or required payments. In that case, the investor may want to know whether OTC contracts include credit-risk-reducing features such as bilateral netting.

Do the derivatives used, or the overall positions in the portfolio, have nonlinear payoffs? Options are the prime example of an instrument with nonlinear payoffs. As we have seen, mortgage-backed instruments contain embedded options, as do convertible bonds. Some dynamic trading strategies, including the dynamic trading that may be used to hedge certain market neutral positions, are essentially option positions. Such positions tend to be very condition-specific; they may have gains in some, maybe even many, market environments, but generate losses under other, slightly different, conditions. They can thus contribute to portfolio risk in ways that are difficult to anticipate.

In general, is leverage reasonable in light of the volatility of the underlying investments and the liquidity of the underlying investments? High leverage combined with high volatility of underlying assets, or low liquidity of underlying assets, is high risk. Furthermore, volatility and liquidity are often related. In particular, in declining markets, liquidity tends to decrease and volatility tends to increase. Unfortunately, this is just when leveraged portfolios are likely to be hit by demands for increased collateral, or margin, or haircuts. If the manager does not have sufficient capital on hand to meet these margin calls, assets may have to be sold. But the more volatile and illiquid the markets, the more difficult it will be to sell.

Has the level of leverage changed over the history of the portfolio, or is it expected to change? Within what bounds? Under what conditions? Changes in leverage may be the result of conscious decisions by the manager. For example, the manager may increase leverage in order to take advantage of an increase in perceived investment opportunities. If the manager intends to employ leverage in such an opportunistic fashion, the intent should be made clear to investors. Of course, leverage may also change unintentionally, as the result of changes in market conditions. Unintended, unexpected increases in leverage signaled the downfalls of both ACM and LTCM. The manager should be clear about the maximum and minimum levels of leverage expected to be employed and about any contingency plans that will be followed should leverage exceed specified limits.

How well diversified is the portfolio—across positions, across markets, across sectors and industries, across any counterparties to derivatives and borrowing arrangements? As has been noted time and again in this volume, diversification provides a first bastion against unexpected risks and is a prime tool of risk control. However, diversification doesn't always work. As the events of 1998 demonstrated, the negative or low correlations between different assets and different countries' markets can turn suddenly positive in times of financial crisis, such as the Russian bond default. As LTCM discovered, such "phase-locking" behavior can wreak havoc with portfolio diversification.[6] Does risk management take into consideration the effects of such unexpected changes in correlation coefficients?

What is the investment process? Can the manager explain it to you? Some strategies, such as risk arbitrage, are highly dependent on in-depth analyses of individual companies. Others, such as mortgage arbitrage, are highly dependent on computer-based models for valuation. How much of the process is model-based? How is model risk controlled? Are portfolio returns and risk monitored in such a way that the manager can tell whether the models employed are performing as expected?

Where is the value-added coming from? Is the fund the product of an individual "genius"? With few exceptions, "genius" is highly suspect. It is also impossible to transfer, should the "genius" decide to move on or retire. Does the fund benefit from access to or use of unique data? From truly proprietary models for analyzing data, valuing securities, constructing the portfolio? An edge in trading—either speedwise or costwise?

Does the manager impose capacity constraints on investments in the portfolio? How popular is the overall strategy generally? As the amount invested in a particular strategy (across managers) increases, the ability to buy into or sell out of particular positions may become impaired and spreads between long and short positions tend to narrow. Potential returns fall, liquidity declines, and risk increases.[7]

What methods are used to value the assets in the portfolio? Market neutral strategies may involve securities such as bonds or mortgage-backed securities, or instruments such as OTC derivatives, that are not very liquid. It is important to know in this case how the manager values these assets for reporting purposes. As ACM demonstrated, the valuation of illiquid assets can be subject to manipulation.

Are there legal or tax-related reasons for not investing in the strategy? For example, some investment mandates may restrict the use of derivatives to hedging. While the derivatives used in most market neutral strategies might qualify as hedges, a derivatives position used to establish exposure to an asset class in an alpha transport strategy would not qualify as a hedging vehicle. Furthermore, some market neutral strategies are very trading-intensive, and may not be suitable for investors who are not tax-exempt.

Are management fees incentive based? If so, how are hurdle rates set? Is the risk level of the portfolio explicitly considered, so that the manager does not have an incentive to take unreasonable risks in pursuit of fee-producing returns?

What benefits does the strategy offer? Many investors look to market neutral strategies as a means of diversifying traditional investments in stocks, bonds, and/or bills. In particular, market neutral strategies are sought as a hedge against downturns in security markets. As we have noted in our chapter on market neutral equity, however, an investor can achieve such diversification by other means.[8] Thus, while market neutral strategies can offer diversification benefits, they should not be sought merely for that end. Rather, a market neutral strategy should be able to offer benefits that cannot be obtained by other means.

We believe that market neutral strategies have the potential to enhance portfolio performance vis-à-vis traditional long-only investing because they are able to exploit more investment opportunities. They can take advantage of price declines as well as price advances. Furthermore, because they are able to offset the risks of long positions with short positions, they have the potential to provide greater control of overall portfolio risk compared with traditional long-only investing.[9] The net result should be enhanced portfolio performance.

Finally, market neutral portfolios provide investors with incredible flexibility in both manager selection and asset allocation. The investor can look for managers with the greatest skill, whatever their investment arena, and use the market neutral structure combined with alpha transport to bring that skill set into the investor's desired allocation.[10] The investor does not have to sacrifice the active return from security selection in order to maintain a desired asset allocation profile.

Market neutral strategies may seem complex, with their reliance on derivatives, shorting, and leverage, and their need to balance long and short exposures. However, because they allow one to separate security selection from asset allocation, market neutral strategies can actually simplify the investment process.[11]

NOTES

[1] See Bruce I. Jacobs, *Capital Ideas and Market Realities: Option Replication, Investor Behavior, and Stock Market Crashes* (Oxford, UK: Blackwell Publishers, 1999); and Bruce I. Jacobs, "When Seemingly Infallible Arbitrage Strategies Fail," *Journal of Investing*, Spring 1999.
[2] See, for example, Mark J. P. Anson, "Hedge Fund Risk Management for Institutions," in V. R. Parker (ed.), *Managing Hedge Fund Risk* (London: Risk Books, 2000); Andrew Lo, "Risk Management for Hedge Funds: An Introduction and Overview," *Financial Analysts Journal*, November/December 2001; and George Chow and Mark Kritzman, "Value at Risk for Portfolios with Short Positions," *Journal of Portfolio Management*, Spring 2002.
[3] See Andrew B. Weisman, "Dangerous Attractions: Informationless Investing and Hedge Fund Performance Measurement Bias," *Journal of Portfolio Management*, Summer 2002.
[4] See Clifford Asness, Robert Krail, and John Liew, "Do Hedge Funds Hedge?" *Journal of Portfolio Management*, Fall 2001.
[5] One way to assess the effects of such risks is to use asynchronous time simulation models such as that proposed in Bruce I Jacobs, Kenneth N. Levy, and Harry M. Markowitz, "Financial Market Simulation," *Journal of Portfolio Management*, 30th Anniversary Issue, 2004.
[6] See Jacobs, "When Seemingly Infallible Arbitrage Strategies Fail"; and Bruce I. Jacobs, "Risk Avoidance and Market Fragility," *Financial Analysts Journal*, January/February 2004.
[7] See Jacobs, "Risk Avoidance and Market Fragility."
[8] See also Bruce I. Jacobs, Kenneth N. Levy, and David Starer, "On the Optimality of Long-Short Strategies," *Financial Analysts Journal*, March/April 1998.
[9] See Bruce I. Jacobs, Kenneth N. Levy, and David Starer, "Long-Short Portfolio Management: An Integrated Approach," *Journal of Portfolio Management*, Winter 1999.
[10] See Bruce I. Jacobs and Kenneth N. Levy, "Alpha Transport with Derivatives," *Journal of Portfolio Management*, May 1999.
[11] See Bruce I. Jacobs and Kenneth N. Levy, "20 Myths about Long-Short," *Financial Analysts Journal*, September/October 1996.

Glossary

active management An investment approach that seeks, by managing asset positions, to increase returns and/or reduce risks relative to unmanaged index benchmarks.

active return The return attributable to a manager's skill at active management.

adjustable-rate instrument A financial instrument whose periodic interest payments can be reset in relation to some reference rate.

advisory opinion A ruling issued by the U.S. Department of Labor to a specific entity setting forth its opinion on a specific issue. An advisory opinion is similar to a private letter ruling issued by the U.S. Internal Revenue Service.

alpha The risk-adjusted return on an asset or portfolio of assets in excess of the return attributable to general market movements.

alpha transport Using derivatives to move the active return and risk from an investment strategy's asset class to another asset class.

Antitrust Division The division of the U.S. Department of Justice charged with enforcing laws meant to prevent the creation or operation of monopolies and the restraint of trade.

acquisition indebtedness Subject to certain exceptions, the unpaid amount of indebtedness incurred by an Exempt Organization (a) in acquiring or improving property; (b) before the acquisition or improvement of such property if the indebtedness would not have been incurred if the acquisition or improvement was not made; or (c) after the acquisition or improvement of such property if the incurrence of such indebtedness was reasonably foreseeable at the time of such acquisition or improvement and would not have been incurred but for the acquisition or improvement.

arbitrage operations Transactions involving the purchase and sale of securities (or the right to acquire securities) that are entered into for the purpose of profiting from the current difference between the price of the asset purchased and the price of the asset sold, provided the taxpayer promptly and clearly identifies the transaction and the asset purchased, if not identical to the asset sold, entitles or will entitle the taxpayer to acquire assets identical to those sold.

arbitrage spread In merger arbitrage, the difference between the price at which target shares can be acquired and the price the acquiring company is offering to pay upon completion of the merger.

asset allocation The deployment of investments across asset classes in order to take advantage of the risk and return characteristics of the classes, and their correlations, so as to achieve a desired investment objective.

averaging period See *pricing period*.

basis point One-hundredth of 1%.

basis risk The risk of a change in the relationship between the price of a futures contract and that of its underlying instrument.

basis trade In bond trading, the purchase/sale of a futures contract on a bond or bonds and the concurrent sale/purchase of the underlying bond(s).

beta A measure of an asset's or portfolio's systematic risk, calculated as the covariance between the returns on the asset or portfolio and market returns, divided by the variance of market returns. Beta reflects the sensitivity of an asset's price to changes in the level of the broad market; for example, the price of an equity with a beta of 0.75 may be expected to increase by 0.75% when the overall equity market rises by 1%.

Blue Book A nickname for the book produced by the staff of the Joint Committee on Taxation after the enactment of legislation effecting a major change in the tax laws.

bond futures contract A contract to buy or sell a bond at a specified price at a specified future date.

bond value The estimated value of a convertible bond assuming the conversion feature does not exist.

Bundesbank The central bank of Germany.

burnout rate The extent to which a pool of mortgages has already been subject to prepayment.

busted security A convertible bond that is very unlikely to be converted and that has a fair amount of credit risk.

buy-in The lender's termination of a loan of stock to a short seller, resulting in the short seller's need to cover the short position.

buy-in provision The right of a bond purchaser to buy bonds in the open market if failed to for an extended period, and to charge the failer for the purchase.

call option An instrument that gives its holder the right (but not the obligation) to buy a specified asset at a specified price on or before a specified future date.

call schedule The dates and dollar amounts at which an issuer has the right to redeem a bond prior to maturity.

cap A maximum value, or ceiling, for a security, or its return, specified in a contract or offered by an instrument such as an option.

capital asset Property not specifically listed in the exceptions to U.S. Internal Revenue Code section 1221 and property that does not substitute for the taxpayer's receipt of ordinary income.

capital asset pricing model (CAPM) A model of expected returns that posits that an asset's expected return varies directly with its beta.

capital gain/loss A gain or loss resulting from the sale or exchange of a capital asset.

cash-and-carry trade The purchase and funding of a bond to a futures settlement date.

cash-futures basis The price difference between a cash bond and the futures contract it is hedged against, adjusted by a conversion factor.

cash merger A merger deal in which one company (the "acquirer") offers to purchase another (the "target") by making cash payments to the target, which then distributes the cash to its shareholders.

cash-settled forward contract A contract to purchase property in the future for a specified price, which the seller settles in cash in lieu of a delivery of the property referenced in the contract.

central bank The bank or institutions responsible for a country's monetary policy; in most cases, the issuer of sovereign debt.

Central Gilts Office (CGO) The computerized clearinghouse for U.K. government debt instruments.

cheapest-to-deliver (CTD) The bond within a deliverable basket that has the lowest value when its market price is multiplied by its conversion factor.

Chicago Board of Trade (CBOT) The main U.S. exchange for trading financial futures, including U.S. government bond futures.

Clayton Act U.S. legislation, passed in 1914, that applies to potential mergers and acquisitions the test of whether the merger/acquisition will reduce competition in the relevant industry or industries.

clearing broker A member of an exchange who acts to process trades of nonmembers.

collar A combination of option positions on an underlying asset that sets a floor for the minimum value and a cap on the maximum value.

collar merger A merger deal that puts a floor on the minimum value of acquirer shares and a cap on the maximum value of acquirer shares, or a floor on the minimum number of acquirer shares and a cap on the maximum number of acquirer shares, that must be exchanged for target shares on completion of the merger.

collateral In short selling, a cash deposit or a deposit of high-grade, liquid securities provided to the securities' lender against delivery of the securities that were borrowed to sell short. More generally, the security held against a loan and used to secure the obligation of a borrower to repay the loan.

collateralized mortgage obligation (**CMO**) A type of mortgage-backed bond where the repayments of principal are separated into different maturity streams.

Commodity Futures Trading Commission (**CFTC**) The U.S. federal regulatory agency that oversees and regulates U.S. markets for futures and options on futures to help insure market integrity and protect market participants.

constant yield method A method for allocating discount over the term of a debt instrument issued with "original issue discount."

constructive sale A transaction whereby a taxpayer is treated as having sold an appreciated financial position for its current fair market value when the taxpayer enters into one or more offsetting positions that effectively eliminate substantially all risk of loss and opportunity for gain from the appreciated financial position. A short sale is treated as a constructive sale for tax purposes if the short seller holds an appreciated financial position that is the "same or substantially identical" to the securities that are shorted.

contingent exchange ratio stock merger A merger deal in which the amount of stock paid by the acquirer to obtain a specified amount of stock of the target can vary depending on the acquirer's average stock price over a specific period (the pricing period).

contingent payment rights A contingent right of a holder to receive a cash payment from a corporation if the market price of the corporation stock is above a specified price on a specified date.

contract market A board of trade designated by the Commodity Futures Trading Commission as permitted to effect a commodities transaction.

conversion factor A multiplier applied to a bond in a deliverable basket to equate the bond's price to the price it would trade at were it to yield the same as the notional value of a government bond futures contract; used to homogenize the bonds in a deliverable basket.

conversion feature (**conversion option**) The feature that allows the holder of a convertible security to redeem it for stock of the issuer, the debt of a party related to the issuer, or the stock of an entity other than the issuer.

conversion ratio The number of shares for which a convertible security can be redeemed.

conversion value The conversion ratio times the current price of the security received in exchange for a convertible security.

convertible bond A bond that, at its owner's discretion, can be redeemed for another security (typically the stock of the issuing company).

convertible debt A debt convertible into the stock of the corporate issuer.

convertible preferred stock Preferred stock that, at the owner's discretion, can be redeemed for the common stock of the issuing company.

convexity A measure of the sensitivity of the duration of a bond or a bond portfolio to changes in underlying interest rates.

correlation A statistical measure of the extent to which the value of one variable, such as security price, tends to move with the value of another, such as market level.

coupon rate The annualized dollar amount of interest paid by the issuer to the bondholder, divided by the face value of the bond.

credit rating An independent agent's measure of the ability of an issuer to repay interest and principal on a debt.

credit spread trade A trade designed to profit from a change in the difference between the interest rates on the debt instruments of two differently rated issuers.

deal risk The chance that an announced merger or acquisition will not be consummated.

dealer equity option Any listed equity option purchased or granted by an option dealer in the normal course of its activity in dealing in options and also listed on the qualified board of exchange on which the dealer is registered.

debenture A debt obligation backed solely by the borrower's promise to repay.

Debt Management Office (DMO) The regulator of the U.K government debt market.

deep-in-the-money call option A call option whose strike price is well below the current price of the underlying security.

defease To produce a cash flow that matches a stream of liability payments.

deliverable basket The group of bonds whose characteristics make them eligible for delivery against a given futures contract.

deliverable bond Bonds whose quality, maturity, principal amount, and coupon rate qualify them to be used for settlement of a futures contract.

delivery date The date by which bonds must be delivered in fulfillment of an open futures contract.

delta (convertible bond) The ratio of the expected price change of the convertible bond to a price change in its conversion value. In effect, the delta gives the sensitivity of the convertible's value to changes in the underlying security's price. For example, a delta of 0.8 means that, for each dollar increase in the conversion value, the price of the convertible should increase by 80 cents.

delta hedging A strategy that seeks to replicate the payoffs to an option position by dynamically trading the underlying security.

derivative A financial instrument whose value is contingent on the value of an underlying security, such as a stock, a stock index, or a commodity.

directional strategy A strategy designed to exploit broad changes in underlying asset prices.

discount rate The interest rate used to convert future cash flows into a current value.

dividend yield The annualized dollar amount of dividends paid per share by an issuer of stock divided by the current stock price.

duration The average maturity of a bond's payments, including coupons and principal. Duration also measures the sensitivity of a bond's price to changes in underlying interest rates.

dynamic hedging See *delta hedging*.

economic accrual basis A method of reporting interest income realistically on a current basis regardless of when it is actually received or the manner in which it is paid.

embedded loan A loan that is deemed to exist with respect to a notional principal contract involving a "significant" upfront payment by the party to the contract to its counterparty.

embedded option An option that is part of a more complex security.

Employee Retirement Income Security Act of 1974 (ERISA) U.S. federal statute governing the retirement and other employee benefit plans provided to employees; it is enforced by both the U.S. Internal Revenue Service and the U.S. Department of Labor.

equity option An option (listed or unlisted) that entitles the holder to buy or sell stocks, or whose value depends directly or indirectly on any stock, group of stocks, or stock index (other than those that trade in, or would be qualified to trade in, a Commodity Futures Trading Commission-designated contract market).

EURIBOR The rate of interest at which first-tier European banks offer funds to each other.

Euroclear A computerized clearinghouse and depository for euromarket security transactions.

European Monetary System The European Economic Community's common monetary system.

excess return See *alpha*.

Exempt Organization Organizations such as qualified retirement plans, individual retirement accounts, publicly supported charitable organizations, and private foundations that are not subject to federal income taxes on income derived from their exempt activities but are taxable on the income they derive from either a trade or business substantially unrelated to such exempt activities or from certain debt-financed property.

extension risk Uncertainty in the value of a CMO due to the possibility that changes in interest rates may lead to a decline in prepayment rates.

extraordinary dividends With respect to a short sale, a cash dividend payment that equals at least 10% (5% in the case of a short sale of preferred stock) of the amount the seller realized from the short sale.

factor bias The degree to which a conversion factor fails to account for a bond's duration.

factor weighting Multiplication of the face amount of a bond by its conversion factor; used to arrive at the number of futures contracts needed to hedge the bond position.

fail When a seller cannot effect delivery of a security that is owed.

fair market value The price at which property would change hands between a willing buyer and a willing seller with neither being under compulsion to buy or sell and both parties having reasonable knowledge of the relevant facts.

Fannie Mae (Federal National Mortgage Association) A corporation sponsored by the U.S. government (but owned by private shareholders) that buys and sells residential mortgages guaranteed by the U.S. Federal Housing Administration and the Veterans' Administration.

fed(eral) funds rate The rate charged for borrowing and lending between U.S. banks.

Federal Reserve Board The board of governors of the U.S. central bank, charged with managing the central bank and monetary policy.

Federal Trade Commission The U.S. federal regulatory body in charge of interstate commerce; responsible for enforcing laws pertaining to maintenance of business competition.

fiduciary A person or entity that manages money or property for the benefit of another person and that must exercise a standard of care in such management activity imposed by ERISA, or another applicable law or contract.

financial leverage The amount of debt in relation to equity in an entity's capital structure.

fixed exchange ratio stock merger A merger deal in which the acquirer agrees to pay a specified number of shares of its stock in exchange for a specified number of shares of the target's stock.

fixed-income instrument/market A financial instrument that pays a known, fixed rate at specified times and/or at maturity, and the market for such instruments.

flat An investment position that has no exposure to a given underlying risk.

floating exchange ratio stock merger A merger deal in which the number of shares to be exchanged for each target share is determined by dividing a specified value for each target share by the acquirer's average stock price over the pricing period.

floating-rate instrument A financial instrument that pays periodic interest at a rate that varies in line with prevailing market rates.

floor A minimum value for a security, or for its return, specified in a contract or offered by a financial instrument such as an option.

foreign currency contract A contract that requires delivery of, or is settled with respect to the value of, a foreign currency in which positions are also traded through regulated futures contracts, that is traded in the interbank market, and that is entered into at arm's length at a price determined by reference to the price in the interbank market.

Freddie Mac (Federal Home Loan Mortgage Corporation) A U.S. government corporation that issues securities backed by pools of conventional mortgages.

funding rate The rate at which a trader can borrow money to pay for a bond.

futures contract An exchange-traded contract to buy or sell an underlying asset at a specified price at a specified future date.

G-10 (Group of Ten) The major industrial countries involved in international financial arrangements (Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, United Kingdom, and United States).

general collateral rate The rate at which most bond purchases can be financed.

general partner A partner in a limited or general partnership who is personally liable for the obligations of the partnership without limit, who has general agency powers subject to contractual limits, and who may act on behalf of the partnership in its normal operations.

gilt market The debt obligations of the United Kingdom.

haircut The portion of the interest on cash proceeds from short sales that is retained by the broker to cover intermediation costs.

Hart-Scott-Rodino Antitrust Improvement Act of 1976 U.S. legislation requiring parties to all mergers involving more than $50 million in consideration to notify the U.S. Federal Trade Commission and the

Department of Justice and to supply them with information needed to access the effect of the merger on competition.

hedge fund An unregulated investment fund, usually restricted to a limited number of wealthy investors, that can employ financial leverage and take long and short positions in securities and commodities.

holding period The period of time that a taxpayer owns property, or is treated as owning property, principally for the purpose of determining whether the taxpayer's sale or exchange of the underlying property qualifies for long-term capital gain treatment.

independent plan fiduciary A fiduciary of an employee benefit plan, usually a "named fiduciary" or trustee, that is not the fiduciary or an affiliate of the fiduciary relying on a particular exemption from the prohibited transaction rules.

information ratio The ratio of the excess return on an investment position to its residual risk.

initial margin The minimum collateral deposit or performance bond required to establish an investment position that involves shorting, borrowing, and/or derivatives; this may be set by regulators, exchanges, or brokers.

integrated optimization An optimization process for long-short portfolio construction that considers long and short positions simultaneously so as to maximize expected return and minimize anticipated risk.

interbank market An informal market through which certain foreign currency contracts are negotiated among commercial banks.

interest-only (IO) security A CMO that passes through to its holders only the interest component of underlying mortgage loans.

interest rate swap An agreement between two parties in which one pays a fixed rate of interest and receives a floating rate and the other receives the fixed rate and pays the floating rate.

International Securities Markets Association (ISMA) A group representing market participants and setting trading rules in the secondary market for eurobonds.

International Swaps and Derivatives Association (ISDA) A self-regulatory industry group involved in setting standards for interest rate swaps, currency swaps, and some other over-the-counter derivatives.

inverse security A floating rate instrument whose coupon varies inversely with changes in the underlying reference rate.

Investment Advisers Act of 1940 U.S. federal statute imposing detailed regulatory requirements regarding the registration and activities of investment advisers.

Keogh plan A form of qualified pension, profit-sharing, or stock bonus plan for self-employed individuals and their employees.

level payment method A method of reporting nonperiodic payments due under notional principal contracts in equal amounts over the term of the contract.

leverage The use of borrowed funds or derivatives to increase exposure to an asset's price changes beyond the actual capital investment.

LIBOR (London Interbank Offered Rate) The interest rate that banks in London offer on short-term, interbank Eurodollar deposits; used as the standard for short-term (up to one year) rates in international markets.

limited liability company An organization formed under state law whereby no member is personally liable for the debts of the company beyond the capital the member invested in the company.

limited partner A partner in a limited partnership who is exposed to the liabilities of the partnership only to the extent of the capital the partner invested in the entity.

liquidity buffer The cash or cash-equivalents retained in an investment account to meet liquidity needs such as margin calls.

listed option Any option other than a warrant to acquire stock from the issuer that is traded on, or subject to the rules of, a qualified board of exchange.

long-short equity portfolio A portfolio that combines long and short stock positions in expectation of profiting from both undervalued securities (held long) and overvalued securities (sold short) and of benefiting from the ability of the short positions to cushion the portfolio from broad market declines.

long-term capital gain/loss A gain or loss resulting from the disposition of a capital asset that has been held for more than one year.

look-through entity An entity, such as a partnership, that is not treated as a separate taxable entity from its beneficial owners for federal income tax purposes.

macro strategy A strategy designed to exploit major economic climate changes.

maintenance margin Margin requirements for ongoing positions. These may be lower than the initial margin requirements for initiating a position.

margin The portion of an investment position's total value that the investor must deposit with a broker or exchange to collateralize that position, to serve as a performance bond, or to qualify for credit.

margin account An investment account, held at a brokerage firm, that can hold securities as collateral for margin purposes.

margin call A demand for additional assets from an investor to make good on guarantee of performance on a position that has moved adversely.

market benchmark A security or group of securities whose performance is used to gauge the performance of other investments.

market maker A dealer in financial assets who maintains an inventory of securities and stands ready to buy and sell on demand.

market neutral A position in securities or a portfolio of securities whose performance is not substantially affected by movements in the overall market from which the securities are selected.

market neutral long-short equity portfolio A long-short portfolio that holds long and short positions of roughly equal market sensitivities and roughly equal dollar amounts.

mark to market The valuation of a position based on its current market price.

married put A put that is acquired on the same day as the securities the investor intends to use in conjunction with the exercise of the option.

maturity The point at which the holder of a bond is paid out the face value or some other terminal payment.

merger arbitrage An investment strategy that seeks to profit by providing insurance to investors in merger situations by purchasing shares in target companies before deal consummation.

mixed straddle account An account clearly identified as a straddle in the taxpayer's books, at least one (but not all) of whose positions are regulated futures contracts.

momentum investing An investment technique that presumes that prices follow trends and that tends to buy as prices rise and to sell as prices fall.

municipal debt obligation Debt obligations issued by or on behalf of a state or local government or municipality.

negative carry When the cost of borrowing exceeds the return on a market position.

net short position The excess at a particular time of the open short positions versus open long positions held by a trader with respect to securities, futures, or options.

nonequity option Any listed option that does not qualify as an equity option, including listed options on commodities, foreign currencies, options on futures contracts, and many options on stock indexes.

nonperiodic payments Any payment made or received with respect to a notional principal contract that is neither a periodic payment nor a termination payment.

notional principal amount Any specified amount of money or property that, when multiplied by a specified index, measures a counterparty's rights and obligations under a notional principal contract.

notional principal contract A financial instrument that provides for payments between two parties at specified intervals over the life of the instrument, where one party periodically pays an amount calculated by applying a rate determined by reference to a specified index to a notional principal amount and the other party pays a similar amount or an amount specified in the terms of the instrument.

notional value Par value.

notional yield The coupon underlying a bond futures contract.

obligor A person who obligates himself to another party by contract.

off-the-run bond A bond that had been out for some time, with coupon rates that may not reflect current market conditions; often less liquid than more current on-the-run bonds.

on-the-run Treasury An informal classification for the most recently issued Treasury instruments, which tend to have the greatest liquidity.

optimization The process of choosing the constituents of an investment portfolio, and their weights, in order to maximize a goal such as investor utility or return-risk tradeoff.

option A financial instrument that conveys the right (but not the obligation) to buy or sell an underlying asset at a specified price (the strike or exercise price) at or before a specified future date (the expiration date).

option-adjusted duration A measure of the duration of a CMO that takes into account the effect of a change in interest rates on prepayment rates.

option-adjusted spread The calculated value of the yield on an option-embedded bond in excess of the yield on a straight bond; for CMOs, the extra yield represents compensation for the added risk incurred from the effects of interest rate changes on prepayment rates.

option dealer Any person registered with an appropriate national securities exchange as a market maker or specialist in listed options, including any person who performs similar functions.

ordinary income/loss Any gross income or loss that is not treated as capital gain or loss.

original issue discount The excess of the stated redemption price payable at the maturity of a debt instrument over the issue price of the debt instrument.

par The face value of a bond at maturity.

passive foreign investment company With respect to any taxable year, a foreign corporation that (a) derives at least 75% of its gross income for the year from specified categories of investment income or (b) holds at least 50% of its assets (measured by fair market value or basis, as the taxpayer chooses) for the production of such categories of investment income.

passive management An investment approach that seeks to provide the performance of a representative market benchmark.

passive portfolio position That part of a portfolio's risk-return profile that reflects the risk and return of the underlying index or benchmark.

pass-through security A security that passes through to its holders the payments made on an underlying pool of debt obligations.

periodic payments Payments made or received pursuant to a notional principal contract that are payable at intervals of one year or less during the contract's term.

planned amortization class (PAC) bond A class of CMOs that tend to have more predictable cash flows because they take precedence over other CMO classes in terms of receiving payments on underlying mortgages and take advantage of support bonds to smooth variations in prepayments.

preferred stock Equity capital ranking below debt but above ordinary shares in terms of dividends and distribution of assets in the event of liquidation. Preferred stock typically has limited voting rights.

prepayment model A model that calculates the rate at which mortgage holders can be expected to repay their mortgages, assuming a wide range of interest rate paths.

prepayment rate The rate at which the mortgages underlying mortgage-backed securities are repaid by the borrowers.

pricing period In a contingent exchange ratio stock merger, the period over which the acquirer's share price is measured in order to determine the exchange ratio (also known as the *averaging period*).

prime broker A broker that executes and settles trades for a margin account, arranges for borrowing shares to sell short, and so on.

principal-only (PO) security A CMO that passes through to its holders only the principal component of underlying mortgage loans.

principal package A group of trade orders submitted to a broker for execution outside U.S. market hours at U.S. market closing prices.

private letter ruling Rulings issued by the U.S. Internal Revenue Service to a specific taxpayer with respect to proposed transactions that are not legal precedents with respect to another taxpayer.

put option An instrument that gives its holder the right (but not the obligation) to sell a specified asset at a specified price on or before a specified future date.

qualified board of exchange A national securities exchange registered with the U.S. Securities and Exchange Commission, a domestic board of trade designated as a contract market by the U.S. Commodity Futures Trading Commission, or a security exchange, market, or board of trade designated by the U.S. Internal Revenue Service.

qualified covered call option A covered call option that (a) is not part of a larger straddle; (b) is traded on a national securities exchange; (c) does not result in ordinary income or loss; (d) was granted more than 30 days before its expiration; (e) is not deep-in-the-money; and (f) was not granted by an option dealer in connection with the activity of dealing in options.

qualified electing fund A passive foreign investment company that annually provides its shareholders with information concerning the ownership of its stock, its earnings for the year, and other relevant facts, and with respect to which a domestic shareholder elects to pay tax on the company's earnings currently, rather than deferring taxation until a specified future event occurs.

qualified professional asset manager (QPAM) A fund manager that (a) is an investment adviser registered with the Securities and Exchange Commission under the Investment Advisers Act of 1940; (b) acknowledges to each plan investor that it is acting as a fiduciary with respect to any plan assets in the fund; and (c) has at least $50 million in assets under management and $750,000 in equity capital as of the last day of its last fiscal year.

quality option The value implicit in a bond's potential for delivery against a futures contract.

ratable daily portion The amount of original issue discount allocable to each day during a taxpayer's holding period for a debt instrument issued at a price less than its stated redemption price at maturity.

rebate fee (rate) See *short rebate*.

regulated futures contract (RFC) A contract traded on, or subject to the rules of, a qualified board of exchange, under which the amount of payments made and received depends on a system of marking to market.

regulated investment company (RIC) A U.S. corporation or trust that (a) is generally registered with the U.S. Securities and Exchange Commission under the Investment Company Act of 1940; (b) meets specific asset diversification, income, and distribution requirements with respect to a taxable year; (c) elects to be treated as an RIC; and (d) is generally subject to federal income taxation on its undistributed investment company taxable income or capital gains.

Regulation T (Reg T) The U.S. Federal Reserve Board regulation governing extension of credit by financial intermediaries for transactions involving margin or borrowing.

relative value strategy A strategy designed to exploit disparities between two similar financial instruments.

repo (repurchase) rate The rate at which a bond purchase can be funded or, conversely, the rate of interest rebated against a bond that is borrowed.

residual risk The risk of a security or portfolio that is not explained by its systematic risk.

rho The interest rate sensitivity of an option.

Russell 2000 An index of 2,000 small-capitalization stocks compiled by Frank Russell Associates.

seasoning The maturity of the mortgages in a given CMO pool.

Section 1256 contract A regulated futures contract, a foreign currency contract, a nonequity option, a dealer equity option, or a security futures contract entered into by a dealer.

sector bias An expression of the preferences of debt purchasers for a given sector (as defined by coupon rate or maturity or other factor) of the bond market.

Securities and Exchange Commission (SEC) The U.S. federal regulatory agency that regulates the issuance and distribution of securities, capital markets, investment companies and their advisers, and certain holding companies.

Securities Exchange Act of 1934 The U.S. legislation regulating the securities industry by, among other things, (a) outlawing manipulative and abusive practices in the issuance of securities; (b) requiring the disclosure to investors of certain financial information and insider activity; and (c) providing the Securities and Exchange Commission with surveillance authority over exchanges and brokers and the authority to enforce the securities laws.

security selection An active investment strategy that seeks to profit via the selection of individual securities.

Sherman Act U.S. legislation, passed in 1890, prohibiting contracts, combinations, or conspiracies that restrict trade or commerce between states or with non-U.S. nations.

short rebate The portion of the interest on the proceeds of a short sale of securities that the short seller receives from the prime broker.

short sale A transaction in which a party borrows securities from another party (the lender) and then sells those securities to a third party, with the agreement to deliver to the lender at a future date securities identical to those borrowed. Shorting is often done in anticipation of a decline in the security's price that will allow the seller to buy the security back and close the position at a profit.

short squeeze A significant rise in the price of an instrument, caused by short sellers covering their positions in response to a buy-in or to market or instrument-specific developments.

short-term capital gain/loss The gain or loss resulting from the disposition of a capital asset that has been held for one year or less.

sovereign debt Debt obligations guaranteed by the full faith and credit of a sovereign nation.

special ex dividend In the U.K gilt market, when a bond trades close to a coupon date and a new purchaser will not accrue interest until after the coupon date.

specialist A dealer of exchange-listed equities who stands ready to buy and sell on demand and is obligated to maintain orderly markets.

squeeze An attempt by traders to control supply in a cash or futures market.

Standard & Poor's 500 A market-capitalization-weighted index of 500 widely held, large-capitalization stocks compiled by Standard & Poor's Corporation.

standard deviation A statistical measure of the dispersion of a distribution of observations, such as stock returns, about their average; calculated as the square root of variance, it is used as a measure of risk.

standstill/static rate of return The total yield on a hedged convertible bond position. It is the sum of the interest earned on the convertible less dividends owed on the short position less net financing costs of the position.

straddle Offsetting positions with respect to actively traded personal property, for which there is an established financial market.

straight-line amortization The amortization of intangible property in equal annual amounts over the useful life of the property.

strike price The price specified in an option contract at which an option holder can buy (in the case of a call) or sell (in the case of a put) the underlying asset. Also known as the exercise price.

support bond Bonds that absorb variations in payments resulting from changes in prepayment rates.

swap A type of notional principal contract between two counterparties who agree to exchange future streams of payments based on a specified index.

swap spread curve The difference between the interest rates on bonds and swaps over different maturities.

swaption An option to enter into a swap.

swap yield curve The yield curve for the fixed portion of interest rate swaps.

systematic risk The portion of an asset's total risk that is attributable to sources of variability common to all assets in the same market. See *beta*.

tail The difference between the nominal value of a bond position and the nominal value of the futures used to hedge it.

tax basis A monetary figure designed to reflect the taxpayer's investment in property.

Technical Advice Memorandum A memorandum issued by the National Office of the U.S. Internal Revenue Service in response to a request for technical advice by taxpayers and Internal Revenue Service administrative personnel involved in an audit.

tender offer An offer by one company (the "acquirer") to buy another (the "target") by purchasing shares directly from the target's shareholders.

termination payment A payment that extinguishes or assigns all or part of the remaining rights and obligations of any party under a notional principal contract.

time decay The decrease in an option's value through time, reflecting the lessening probability that the option will be able to be profitably exercised before expiration.

tranche A group of securities carved out of an underlying pool of cash flows, such as a CMO, sharing characteristics such as cash flow, return pattern, maturity, and the like.

transaction cost The costs incurred in executing a trade, including commissions and bid-offer spreads as well as market impact effects.

Treuhand bond (Treuhandanstalt) Bonds issued by the German government agency for funding East German reconstruction after reuinification. Fully guaranteed by the German government.

unidentified mixed straddle A mixed straddle that the taxpayer does not elect to treat as an "identified" mixed straddle and with respect to which all the constituent Section 1256 contracts are subject to the special tax rules otherwise applicable to such contracts.

Unity bond Bonds issued by the German government at the time of German unification.

unrelated business taxable income (UBTI) The difference between a tax-exempt organization's gross income from any trade or business that is substantially unrelated (other than through the production of funds) to the exercise or performance of the organization's exempt function and the allowable deductions on such trade or business, with certain specified statutory and regulatory modifications.

uptick rules U.S. Securities and Exchange Commission and exchange rules governing when short sales may take place; short sale of a security is generally forbidden except at a price above the price it had previously traded at (uptick rule) or at a price equal to the price it last traded at, when the latter represented an increase over the previous trade price (zero-plus tick).

U.S. real property holding company A domestic corporation whose direct and indirect interests in U.S. real property have a gross fair market value of at least 50% of the combined gross fair market value of its worldwide real property and business assets at any time over the prior five-year period.

variance The sum of the squared deviations of the observations in a sample about their average value, divided by the number of observations.

variation margin The additional collateral required on an open position in futures, options, or margined equity in response to an adverse daily move in the security's price.

vega The sensitivity of an option to changes in volatility.

warrant An option issued by a company, usually in conjunction with a debt issuance, giving the holder the right to purchase a number of shares or bonds of the issuer at a specified price by a specified date.

wash sale A sale of securities at a loss where the taxpayer acquires, or enters into an option or contract to acquire, within a 30-day period beginning before or after such sale, substantially identical securities to those sold at a loss.

whipsaw risk Risk of adverse effect on a security or strategy from sharp, reversing changes in underlying factors such as interest rates.

yield adjustment fee The fee paid by one party to a counterparty with respect to a notional principal contract to compensate the counterparty for the fact that the financial terms of the notional principal contract do not reflect existing market rates.

yield curve A graphic representation of the different levels of interest rates for different maturities.

yield spread The difference between the yields of two debt instruments.

Z bond A CMO class that pays interest and principal only after earlier classes of the CMO have been redeemed.

Index