# Bond Portfolio Investing *and* Risk Management

## POSITIONING FIXED INCOME PORTFOLIOS FOR ROBUST RETURNS AFTER THE FINANCIAL CRISIS

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# Foreword

Every once in a while, a major shock leads people to review the continued relevance of "conventional wisdom," and every once in a while, the result is an evolution in thinking that anchors the emergence of a new conventional wisdom. Those who understand and prepare for such a possibility may gain important first-mover advantages in portfolio management, risk mitigation, and conceptual analysis.

The 2008–2009 global financial crisis surely meets the test of a major shock. It exposed weaknesses at virtually every level of society—from the individuals who bought homes they could not afford, to the banks that took on risks they did not understand, and to regulators who fell asleep at the wheel. The crisis disrupted entire sectors and economies around the world. In the process, the previously unthinkable and highly improbable became both thinkable and probable. The consequences have been and will continue to be material, having an impact on both Wall Street and Main Street.

At its most basic level, the 2008–2009 crisis reflected a massive failure of risk management, again at every level of society. The size and composition of numerous balance sheets were allowed—indeed enabled—to get to unsustainable levels, and risk identification and mitigation were diluted, lulled into a sense of complacency by all the prior talk (in 2006–2007) of "the great moderation" and "Goldilocks."

Vineer Bhansali has been among the leaders in showing a willingness and an ability to espouse a fresh new perspective on both fixed-income investing and risk management. His perspectives were born well before the financial crisis, based on forward-looking analysis and the courage to question the conventional way of doing and thinking about things. They evolved dynamically in the midst of the crisis and are now acting as a magnet for other forward-looking analyses.

I first came across Vineer when he joined PIMCO in 2000. My PIMCO colleagues and I were attracted to the quality of Vineer's thinking and his willingness to question and debate. And we were not the only ones. His repeated ability to publish papers in respected academic and industry journals confirmed what we saw in Vineer.

In 2006, Vineer embarked on the intellectually demanding task of thinking about portfolio positioning and risk management in terms of risk factors rather than just asset classes. By then, I had left PIMCO for a 22-month stint at Harvard Management Company (HMC), the entity responsible for managing the university's endowment. And coincidently, my HMC colleagues and I were dealing with the same analytical challenges.[1]

In every investment made, investors underwrite a distinct combination of risk factors—whether they know it or not. For simplicity, the industry has bundled these risk factors into asset classes that can be elegantly presented in model portfolios and benchmarked and followed using relatively simple indices.

This shorthand makes sense in an "equilibrium" state that is characterized by stable correlations and little, if any, structural change. But it is severely challenged in a changing world, with national and global regime shifts—such as the reality that we live in today. Correlations among asset classes become unstable, and the very definition of asset classes may blur. In such a world, investors must go beyond asset classes and ask about their risk factor exposures—an important yet far from simple requirement.

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[1] See El-Erian, Mohamed A., *When Markets Collide: Investment Strategies for the World of Global Economic Change*. New York: McGraw-Hill, 2008.

This is just one of the many insights offered by Vineer Bhansali in this valuable and timely book. His analysis elegantly speaks to the what, how, and why. For example, risk factor analysis is explained in detail. Vineer shows how and why it contributes to better portfolio management and more responsive risk management. As a result, the tradeoffs between risk and return become clearer, as does the interaction between cyclical and secular forces and between bottom-up and top-down factors.

This book will be of interest to many and of particular use to two groups of readers—those of you who are involved in portfolio construction and analysis and those who are interested in how analytical advances make their way from the minds of people to the day-to-day reality of portfolio and risk management. I hope that you will all benefit from this book as much as I did.

Mohamed A. El-Erian
CEO and co-CIO, PIMCO
Author of *When Markets Collide*

# Acknowledgments

I would like to thank numerous colleagues and collaborators at PIMCO, Credit Suisse First Boston, Salomon Brothers, and Citibank, as well as researchers and coauthors from academia with whom I have worked over the years. Thank you for educating me and for your insights and comments.

The major impetus for writing this book was PIMCO's clients, with whom my interactions over the last ten years have required constant refinement and precision of thought. Many PIMCO colleagues who were part of our presentations suggested that I write them up as a book. A special thanks to our clients for the opportunity to be of service.

My special thanks to Mohamed El-Erian and Bill Gross, who by their example of clarity, depth, and perception continue to raise the bar for investors. No author can even come close to explaining their investment acumen and perception. One rarely gets the privilege of observing such brilliance at close quarters. I learn every day from them.

The inspiration for my writing remains my parents, whose mantra of "strive for excellence" points my inner compass. The voyage has only begun.

My sons Zane and Kieran have been sources of unbelievable joy and affection. This provided the all-important balance of perspective.

Most importantly, this book could not have been completed without the unwavering love and support of my wife Beka. Thank you for your support and for letting me to go on those long runs where most of the thinking "work" was done.

# Preface

The title of this book suggests that there is or will be a state of the world *after* the financial crisis. Whether this new state is different from anything we have ever seen or the same as we have always seen with new twists will be hard to tell definitively until it's too late. We also know that there will be more crises in the future. But a bond investor should not be held to the too-high standard of being able to forecast beyond doubt what regime of the world we are in now and how and when we will switch to another one. Bonds are conservative investments, and bond portfolios ought to be structurally positioned to both add value over the riskless rate (at essentially 0 percent today) and not lose substantial value over cycles.

## Audience

This book is targeted toward professionals involved in institutional fixed income investment. I visualize the user as a specialist (trader, portfolio manager, financial engineer) involved in one of the mainstream fixed income areas who is eager and prepared to use a source from which to learn practical investment techniques and tools for investment decision making. I have had the privilege of meeting clients over the years who have planted the seeds for many of the ideas and thoughts in this book. I found myself refining the ideas I have learned and invented over the years to a degree where I could present the coherent whole in a manner that made sense. The ultimate purpose of this clarity is to provide the tools for making better investment decisions. While I tried to keep this book free of stochastic calculus and graduate-level math (the curious reader can learn those techniques from my other recent book with Mark Wise entitled, *Fixed Income Finance: A Quantitative Approach*, published by McGraw-Hill in 2010), I had to lean on simple mathematical arguments to make some points concisely. I hope they do not distract the reader too much from the conceptual thrusts of this book. For many, who have seen and heard this discussion before, seeing it all laid out in paper might answers questions not answered in our meetings.

## History of the Book

The hardest part is to think about what to put in and what to leave out, and over the last three to five years I have refined the outline to what I consider are the essential and most important parts for real investments. Much of the book was written three or four years ago, but then the crisis happened, and not only did I not get a chance to finish, but I also learned so many new things that I considered waiting to write a more relevant book the best choice. But authors have deadlines, so at some point I had to turn the screens off, quit working on new research (and reading the copious academic literature), and just write what I could. I am happy to report that despite all the new *facts* that have emerged, the *concepts* have not changed over the last few years and through the crisis. So I could easily have titled the book *How to Construct Robust Portfolios through and after Crises* instead of what you have on the cover. I also think that the best books are short, with a very compact and direct discussion of the relevant topics with examples, so I have tried to provide as many examples as I could. To make the principles more user-friendly, I use Bloomberg screens (which in my view is the major public, nonproprietary tool used by participants) to illustrate quantitative concepts. I find the ability of users to "touch" the numbers makes a big difference in their faith in using the concepts and tools.

## How This Book Is Different

There are, of course, a number of excellent books on fixed income topics (such as the survey ones by Fabozzi), as well as books on modeling (Tuckman) and risk management (Golub et al.). In addition, there are a number of excellent MBA-level books that survey the broad markets and principles of asset allocation. In my view, most books do not give a unified, simple treatment of how fixed income investors actually think about risk and return, especially principles that focus on crisis resistance. They do not include most recent research from tightly attended practitioner conferences and workshops on topics of current interest whose content has not yet reached the printed page.

## Why This Book?

I think there are a number of things my book has to say that are hard to find in traditional books written by academics or by practitioners with a more specialized focus. For instance, topics discussed here include incorporation of economics in financial modeling, measurement of liquidity and stress risks, asset allocation, discussion of the state of the art macro models, anomalies in markets such as munis, cross-market (e.g., FOREX and fixed income) relationships, forecasting of cyclical returns and risks, tail-risk measurement, and so on. I thought hard about especially simplifying the concepts and unifying and separating the facts that matter from the facts that are irrelevant.

## The Key Idea

If there is one idea that carries more relevance than any other, it is that excess yield usually comes with excess risk, and this excess return and excess risk can be qualitatively explained as a short option position. While any individual option might trade cheap or rich from period to period, a portfolio of sales of such options, well diversified, properly scaled, and hedged against catastrophic risk, has odds tilted in its favor.

## Outline of the Book

Chapter 1 starts with a summary of key risk factors in fixed income and the predictability of risk and return. In my view it is most important to start with risk, with a focus on the risk factors that matter. The chapter concludes with a look back at the crisis of 2007-2008 and what one can do to create a robust portfolio construction process. Chapter 2 discusses the basic building blocks of fixed income investing. Instead of beginning with a survey of the different types of securities that comprise the fixed income investment universe, we dig a layer deeper to focus on risks, and to examine how optionality plays a key role in risk and return computations. The chapter emphasizes keys to the understanding of financing and repo markets (even for a non-levered portfolio). We also discuss swaps and asset swaps, which are essentially liability transformation mechanisms. Finally, we discuss scenario analysis as the imperfect but essential tool for the evaluation of complex mortgage linked securities that consist of heterogeneous underlying cashflows that are highly sensitive to initial conditions. Chapter 3 gets to the root of structural investing, that is, the approach to harvesting fixed income risk premia across a wide variety of markets. It is the ability to evaluate these opportunities that makes fixed income investing so special, and creates the necessary mix for a portfolio for all seasons. I am indebted to the education I have received from Bill Gross in this area over the last twenty years of following his writing and more recently working for him. Chapter 4 digs into the relevance of a macroeconomic framework for model building. I think this is a topic that is ignored in most classic fixed income and even broad finance books, partly because it is so hard to make concrete statements that can be quantified. I take the risk of trying to wade the treacherous waters of macroeconomics as relevant to investing, only because it is so critical to making robust decisions. In Chapter 5 we discuss replication and use of derivatives to create risk and return profiles of key "betas" that we find in fixed income markets. ETFs have become the rage in the markets recently, because they allow investors to create asset allocation mixes at low costs. This replication is based on matching risk factors as we have discussed in the introductory chapters of the book. Chapter 6 discusses risk management from a stress testing approach. Instead of using Value at Risk, where aggregation results in loss of information, I find it easier to manage and measure risks using concentrations in "risk silos," i.e., disaggregate risk limits. This chapter discusses the practical aspects of designing and implementing a robust risk measurement platform. Finally, in Chapter 7 we bring in asset allocation—it is not sufficient to understand how bonds behave in isolation from other assets. Investors want to know how to include bonds in the context of their broader asset allocation portfolio. This requires understanding of the common risk factors, such as the equity factor, that pervades both bonds and other risky asset classes, and incorporation of forward looking views in a robust fashion into investment allocations. The book concludes with a recap and an epilogue of the key principles. My purpose in writing this book is to tell a unified story which evolves in a way that shows the connection of all the pieces. If I succeed in communicating what I have learned from so many others and from my own research in these few hundred pages all the work will have been worth it!