FIXED INCOME
ANALYSIS
CFA Institute is the premier association for investment professionals around the world, with over 124,000 members in 145 countries. Since 1963 the organization has developed and administered the renowned Chartered Financial Analyst® Program. With a rich history of leading the investment profession, CFA Institute has set the highest standards in ethics, education, and professional excellence within the global investment community and is the foremost authority on investment profession conduct and practice. Each book in the CFA Institute Investment Series is geared toward industry practitioners along with graduate-level finance students and covers the most important topics in the industry. The authors of these cutting-edge books are themselves industry professionals and academics and bring their wealth of knowledge and expertise to this series.
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Recently, one of my colleagues took some shirts down to the One-Hour Dry Cleaner.

“They’ll be ready next Tuesday,” said the owner.

My friend said, “But I thought you did one-hour dry cleaning?”

“Oh, no,” said the owner, “that’s just our name.”

So it is in today’s “fixed income” market. It’s just a name. There was a time when that name accurately described the securities in that market, and it was certainly a much easier time to learn about the fixed-income world. Not much is fixed anymore. Maturities can vary, coupons can float, principal balances can pay down in unpredictable ways, and so on. And those are only the “normal” fixed-income securities. The market includes securities whose coupons go up when rates go down, securities that accrue interest only when certain conditions are met, and securities that pay off something other than par at maturity. We have so-called catastrophe bonds that may pay nothing at maturity, but that’s not why they’re called catastrophe bonds. How can you possibly learn about such a diverse market? This book is a good start.

It all begins with the first section, on the essentials. This section starts with “defining elements,” which surveys the breadth and diversity of fixed-income securities and provides details on the distinguishing features of all types of bonds. The next chapter, on issuance, trading, and funding, describes the markets, venues, and conventions for bond trading and, consistent with CFA Institute’s global reach, has a global focus. Next, the chapter introducing valuation provides a basic understanding of the methods used to value fixed-income securities and to determine relative values between them.

Owning fixed-income securities entails various risks. The second section of the book deals with identifying and quantifying those risks and explores some of the complex quantitative modeling now in use. Both interest rate risk and credit risk are covered here.

The third section deals with asset-backed securities. This broad category encompasses mortgage-backed securities and the many other types of assets that have been “securitized,” including home equity loans, car loans, credit card loans, boat loans, royalty payments, and more. Often, the securities are broken into tranches, which will typically have different priorities in terms of timing, credit, and stability of payments. A keen understanding of these securities is crucial to success in the fixed-income market. Many of the securities, especially collateralized mortgage obligations, are poster boys for uncertain cash flows.

In the fourth section comes detailed analysis of valuation methods for fixed-income securities. It starts with the general approach to valuing a set of cash flows and then extends into analysis that is useful for securities with uncertain cash flows.

Of course, valuation is impossible to do in a vacuum. Every new bond that is issued is positioned somewhere in a thick soup of all the existing bonds. Together, the bonds, their unique terms, their buyers and sellers, alternating waves of fear and greed, and of course, central banks determine the interest rate structure in the market. This “term structure of interest rates” is the subject of the fifth section of the book.
Finally, the last section deals with managing fixed-income portfolios. Long gone are the days when a simple “laddered” portfolio would meet most fixed-income investors’ needs. Over the years, a variety of techniques—many unique to the fixed-income market—have been developed to meet various objectives and constraints. This final section covers much of the landscape; indeed, a look at the learning outcomes gives a sense of the broad coverage in this section.

I received my CFA charter 34 years ago. Many of the security types mentioned in this book had not been created then, and of course, neither had the valuation approaches. Fixed income was at that time at the very beginning of its quantitative revolution. The fixed-income readings for Level II and Level III came largely from *Inside the Yield Book*, by Marty Leibowitz. Before reading that book, I had thought—and had even said aloud while teaching—“Bonds are boring.” That book opened my eyes, and less than two weeks after I took Level III, I started working for Marty at Salomon Brothers.

I can’t promise you that this book will have such a profound effect on your life, but I expect it will for many readers. I have had the good fortune to work with a number of the authors of this book over the years, and I know that their decades of educational and practical experience, together with active guidance by CFA Institute, make this book well worth reading for those studying for the CFA exam and anyone who wants grounding in today’s complex fixed-income market. Good luck!

Bob Kopprasch, PhD, CFA
5 November 2014
PREFACE

We are pleased to bring you Fixed Income Analysis, which provides authoritative and up-to-date coverage of how investment professionals analyze and manage fixed-income portfolios. As with many of the other titles in the CFA Institute Investment Series, the content for this book is drawn from the official CFA Program curriculum. As such, readers can rely on the content of this book to be current, globally relevant, and practical.

The content was developed in partnership by a team of distinguished academics and practitioners, chosen for their acknowledged expertise in the field, and guided by CFA Institute. It is written specifically with the investment practitioner in mind and is replete with examples and practice problems that reinforce the learning outcomes and demonstrate real-world applicability.

The CFA Program curriculum, from which the content of this book was drawn, is subjected to a rigorous review process to assure that it is:

- Faithful to the findings of our ongoing industry practice analysis
- Valuable to members, employers, and investors
- Globally relevant
- Generalist (as opposed to specialist) in nature
- Replete with sufficient examples and practice opportunities
- Pedagogically sound

The accompanying workbook is a useful reference that provides Learning Outcome Statements, which describe exactly what readers will learn and be able to demonstrate after mastering the accompanying material. Additionally, the workbook has summary overviews and practice problems for each chapter.

We hope you will find this and other books in the CFA Institute Investment Series helpful in your efforts to grow your investment knowledge, whether you are a relatively new entrant or an experienced veteran striving to keep up to date in the ever-changing market environment. CFA Institute, as a long-term committed participant in the investment profession and a not-for-profit global membership association, is pleased to provide you with this opportunity.

THE CFA PROGRAM

If the subject matter of this book interests you, and you are not already a CFA charterholder, we hope you will consider registering for the CFA Program and starting progress toward earning the Chartered Financial Analyst designation. The CFA designation is a globally recognized standard of excellence for measuring the competence and integrity of investment professionals. To earn the CFA charter, candidates must successfully complete the CFA Program, a global
graduate-level self-study program that combines a broad curriculum with professional conduct requirements as preparation for a career as an investment professional.

Anchored by a practice-based curriculum, the CFA Program Body of Knowledge reflects the knowledge, skills, and abilities identified by professionals as essential to the investment decision-making process. This body of knowledge maintains its relevance through a regular, extensive survey of practicing CFA charterholders across the globe. The curriculum covers 10 general topic areas, ranging from equity and fixed-income analysis to portfolio management to corporate finance—all with a heavy emphasis on the application of ethics in professional practice. Known for its rigor and breadth, the CFA Program curriculum highlights principles common to every market so that professionals who earn the CFA designation have a thoroughly global investment perspective and a profound understanding of the global marketplace.
ACKNOWLEDGMENTS

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We would like to thank the many distinguished authors who contributed outstanding chapters in their respective areas of expertise:

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Special thanks to all the reviewers who helped shape the materials to ensure high practical relevance, technical correctness, and understandability.

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Acknowledgements

Production
We would lastly like to thank the many others who played a role in the conception and production of this book: Robert E. Lamy, CFA; Christopher B. Wiese, CFA; Wanda Lauziere; Carey Hare; Margaret Hill; Kelly Faulconer; Julia MacKesson and the production team at CFA Institute; Maryann Dupes and the Editorial Services group at CFA Institute; and Brent Wilson and the Quality Control group at CFA Institute.
ABOUT THE CFA INSTITUTE SERIES

CFA Institute is pleased to provide you with the CFA Institute Investment Series, which covers major areas in the field of investments. We provide this best-in-class series for the same reason we have been chartering investment professionals for more than 50 years: to lead the investment profession globally by promoting the highest standards of ethics, education, and professional excellence for the ultimate benefit of society.

The books in the CFA Institute Investment Series contain practical, globally relevant material. They are intended both for those contemplating entry into the extremely competitive field of investment management as well as for those seeking a means of keeping their knowledge fresh and up to date. This series was designed to be user friendly and highly relevant.

We hope you find this series helpful in your efforts to grow your investment knowledge, whether you are a relatively new entrant or an experienced veteran ethically bound to keep up to date in the ever-changing market environment. As a long-term, committed participant in the investment profession and a not-for-profit global membership association, CFA Institute is pleased to provide you with this opportunity.

THE TEXTS

*Corporate Finance: A Practical Approach* is a solid foundation for those looking to achieve lasting business growth. In today's competitive business environment, companies must find innovative ways to enable rapid and sustainable growth. This text equips readers with the foundational knowledge and tools for making smart business decisions and formulating strategies to maximize company value. It covers everything from managing relationships between stakeholders to evaluating merger and acquisition bids, as well as the companies behind them. Through extensive use of real-world examples, readers will gain critical perspective into interpreting corporate financial data, evaluating projects, and allocating funds in ways that increase corporate value. Readers will gain insights into the tools and strategies used in modern corporate financial management.

*Equity Asset Valuation* is a particularly cogent and important resource for anyone involved in estimating the value of securities and understanding security pricing. A well-informed professional knows that the common forms of equity valuation—dividend discount modeling, free cash flow modeling, price/earnings modeling, and residual income modeling—can all be reconciled with one another under certain assumptions. With a deep understanding of the underlying assumptions, the professional investor can better understand what other investors assume when calculating their valuation estimates. This text has a global orientation, including emerging markets.
International Financial Statement Analysis is designed to address the ever-increasing need for investment professionals and students to think about financial statement analysis from a global perspective. The text is a practically oriented introduction to financial statement analysis that is distinguished by its combination of a true international orientation, a structured presentation style, and abundant illustrations and tools covering concepts as they are introduced in the text. The authors cover this discipline comprehensively and with an eye to ensuring the reader's success at all levels in the complex world of financial statement analysis.

Investments: Principles of Portfolio and Equity Analysis provides an accessible yet rigorous introduction to portfolio and equity analysis. Portfolio planning and portfolio management are presented within a context of up-to-date, global coverage of security markets, trading, and market-related concepts and products. The essentials of equity analysis and valuation are explained in detail and profusely illustrated. The book includes coverage of practitioner-important but often neglected topics, such as industry analysis. Throughout, the focus is on the practical application of key concepts with examples drawn from both emerging and developed markets. Each chapter affords the reader many opportunities to self-check his or her understanding of topics.

One of the most prominent texts over the years in the investment management industry has been Maginn and Tuttle's Managing Investment Portfolios: A Dynamic Process. The third edition updates key concepts from the 1990 second edition. Some of the more experienced members of our community own the prior two editions and will add the third edition to their libraries. Not only does this seminal work take the concepts from the other readings and put them in a portfolio context, but it also updates the concepts of alternative investments, performance presentation standards, portfolio execution, and, very importantly, individual investor portfolio management. Focusing attention away from institutional portfolios and toward the individual investor makes this edition an important and timely work.


Quantitative Investment Analysis focuses on some key tools that are needed by today's professional investor. In addition to classic time value of money, discounted cash flow applications, and probability material, there are two aspects that can be of value over traditional thinking. The first involves the chapters dealing with correlation and regression that ultimately figure into the formation of hypotheses for purposes of testing. This gets to a critical skill that challenges many professionals: the ability to distinguish useful information from the overwhelming quantity of available data. Second, the final chapter of Quantitative Investment Analysis covers portfolio concepts and takes the reader beyond the traditional capital asset pricing model (CAPM) type of tools and into the more practical world of multifactor models and arbitrage pricing theory.

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FIXED INCOME ANALYSIS
PART I

FIXED-INCOME ESSENTIALS
LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- describe the basic features of a fixed-income security;
- describe functions of a bond indenture;
- compare affirmative and negative covenants and identify examples of each;
- describe how legal, regulatory, and tax considerations affect the issuance and trading of fixed-income securities;
- describe how cash flows of fixed-income securities are structured;
- describe contingency provisions affecting the timing and/or nature of cash flows of fixed-income securities and identify whether such provisions benefit the borrower or the lender.

1. INTRODUCTION

Judged by total market value, fixed-income securities constitute the most prevalent means of raising capital globally. A fixed-income security is an instrument that allows governments, companies, and other types of issuers to borrow money from investors. Any borrowing of money is debt. The promised payments on fixed-income securities are, in general, contractual (legal) obligations of the issuer to the investor. For companies, fixed-income securities contrast to common shares in not having ownership rights. Payment of interest and repayment of principal (amount borrowed) are a prior claim on the company’s earnings and assets compared with the claim of common shareholders. Thus, a company’s fixed-income securities have, in theory, lower risk than that company’s common shares.

In portfolio management, fixed-income securities fulfill several important roles. They are a prime means by which investors—individual and institutional—can prepare to fund, with some
degree of safety, known future obligations such as tuition payments or pension obligations. The correlations of fixed-income securities with common shares vary, but adding fixed-income securities to portfolios including common shares is usually an effective way of obtaining diversification benefits.

Among the questions this chapter addresses are the following:

- What set of features define a fixed-income security, and how do these features determine the scheduled cash flows?
- What are the legal, regulatory, and tax considerations associated with a fixed-income security, and why are these considerations important for investors?
- What are the common structures regarding the payment of interest and repayment of principal?
- What types of provisions may affect the disposal or redemption of fixed-income securities?

Embarking on the study of fixed-income securities, please note that the terms “fixed-income securities,” “debt securities,” and “bonds” are often used interchangeably by experts and non-experts alike. We will also follow this convention, and where any nuance of meaning is intended, it will be made clear. 1

The remainder of this chapter is organized as follows. Section 2 describes, in broad terms, what an investor needs to know when investing in fixed-income securities. Section 3 covers both the nature of the contract between the issuer and the bondholders as well as the legal, regulatory, and tax framework within which this contract exists. Section 4 presents the principal and interest payment structures that characterize fixed-income securities. Section 5 discusses the contingency provisions that affect the timing and/or nature of a bond’s cash flows. The final section provides a conclusion and summary of the chapter.

2. OVERVIEW OF A FIXED-INCOME SECURITY

There are three important elements that an investor needs to know about when investing in a fixed-income security:

- The bond’s features, including the issuer, maturity, par value, coupon rate and frequency, and currency denomination. These features determine the bond’s scheduled cash flows and, therefore, are key determinants of the investor’s expected and actual return.
- The legal, regulatory, and tax considerations that apply to the contractual agreement between the issuer and the bondholders.
- The contingency provisions that may affect the bond’s scheduled cash flows. These contingency provisions are options; they give the issuer or the bondholders certain rights affecting the bond’s disposal or redemption.

This section describes a bond’s basic features and introduces yield measures. The legal, regulatory, and tax considerations and contingency provisions are discussed in Sections 3 and 5, respectively.

1Note that the term “fixed income” is not to be understood literally: Some fixed-income securities have interest payments that change over time. Some experts include preference shares as a type of fixed-income security, but none view them as a type of bond. Finally, in some contexts, bonds refer to the longer-maturity form of debt securities in contrast to money market securities.