

Preface

The interest rate swaps market is enormous. The aggregate outstanding notional (or fictitious principal) of over-the-counter (OTC) interest rate swaps and options stood in excess of \$400 trillion by the end of 2010, according to the Bank for International Settlements. These products are used routinely by a variety of financial institutions, including banks, insurance companies, hedge funds, government-sponsored enterprises, and many other corporations for the purposes of effective risk management and/or expressing a view on the market.

One of the hallmarks of these markets (and a theme that is emphasized in this text) is the continued pace of product innovation over the course of time. The building blocks of these markets are interest rate swaps and interest rate options (both caps and floors, as well as swaptions). When these products first came on the scene, they were considered revolutionary. The ability of corporations to transform the nature of their assets and liabilities from fixed to floating (or vice versa) and to hedge their exposure to movements in benchmark interest rates provided a new set of risk management tools.

As these markets developed further, we saw a variety of highly customized (perhaps better known as *exotic*) products emerge. These products allowed financial institutions and other corporations to effectively manage more sophisticated risks or, in some cases, to express more tailored views on the market than had previously been possible with existing products. And around the same time, we saw a new wave of financial engineering of these products enter the scene.

The emergence of swaps with options embedded in them opened up new avenues for the use of this market. Typically, investors short the options embedded in such swaps. As compensation for shorting these options, investors receive a higher fixed coupon than could otherwise be obtained in a “plain vanilla” swap. This led to the formation of a class of trades known as yield-enhancing swaps that competed with products found in other markets (e.g., the mortgage market) and offered new opportunities not otherwise available in any market. There are many, many different types of swaps with embedded options that have emerged and are attractive to a wide range of investors.

The market evolved in another direction as well: the structured note market. The advent of the structured note market represented the marriage of bonds and derivatives. A whole new slew of investors who previously were not involved in the derivatives markets were now gaining access to some of the most sophisticated derivative products that had ever been created. This was a period of time in the derivatives market synonymous with the creation of highly sophisticated products and the use of leverage and, sometimes, excess.

Liquidity in the interest rate swaps market has improved dramatically over the years. A variety of investors have come to regard this market as an avenue of choice for putting on speculative trades in order to express a view on the market. Hedge funds and other proprietary trading accounts use these markets to establish both relative value and macro trades and are an essential part of the market.

The continued theme of innovation has presented itself again more recently. The development and popularity of new types of trades in recent years have created new opportunities for buy-side investors to express views on the market that they could not (easily) express before. Such trades introduce new types and more sophisticated risks that buy-side accounts are exposed to and that sell-side firms have had to manage. Unique trading opportunities have become available as these products have taken off, again indicative of the flexibility that these markets provide to their participants.

The purpose of this book is to provide students and practitioners who are interested in the interest rate swaps market and other closely related OTC derivative markets with an introduction to and understanding of these and other topics. This book is intended to provide the reader with a framework to analyze basic trades, a basis for dissecting more complex trades (i.e., how they are structured, how they work, how we rip them apart), and an ability to structure trades on his or her own. The book was developed in conjunction with a course I have taught at Columbia Business School for the past 16 years.

There are many books in existence that already cover these topics, including the noteworthy recent works by Flavell (2010) and Sadr (2009). However, such books are typically geared for practitioners with a heavy bent toward the technical. In some ways this is very appropriate, as the study of derivatives requires very quantitative methods. But for many readers who are exposed to this material for the first time (and for many practitioners who work in the field of derivatives), the aim is to gain an understanding of how these markets work, how the products are priced and work, and who uses them and why and to acquire intuition when analyzing the numerous types of trades that are popular in these markets, without being bogged down with heavy mathematics.

Numerous textbooks cover the topics of derivatives and/or the fixed income markets, including the excellent works written by Hull (2008) and Sundaresan (2009). But these books are general texts covering a wide range of topics and do not focus exclusively on the material covered here. What these and other similar books cover in a contained section are this book's exclusive focus.

With an aim at providing the reader with an understanding of the OTC interest rate swaps and other closely related derivatives markets, a requisite development of pricing models is necessary in order to avoid having this pursuit become completely trivial. The mathematics utilized in this book is on the level appropriate for MBA students or advanced undergraduate students focused on the study of finance. Those who are interested in more quantitative approaches are better served by books such as Shreve (2004) and Brigo and Mercurio (2006).

The organization of this book is as follows. The book is broken down into nine chapters. The first three chapters focus on interest rate swaps. Chapters 4 and 5 focus on the two basic categories of options that are traded in these markets: caps and floors (discussed in Chapter 4) and swaptions (covered in Chapter 5). Together these five chapters cover the most salient features of the interest rate swaps market and other closely related derivative markets.

As alluded to earlier, the beauty of the OTC interest rate derivative markets is the flexibility that these markets provide their participants. A particular type of trade exists if two counterparties agree to trade it. Using the various products developed in Chapters 1–5 as building blocks, Chapter 6 introduces this notion by examining a number of different types of swaps that have options embedded into them. Chapter 7 introduces the structured note market, the market that represents the marriage of traditional fixed income debentures and OTC derivatives. Chapter 8 surveys a number of relative value and macro trades that have been popular over the years with a variety of market participants. Finally, Chapter 9 delves into a

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couple of exotic product innovations that have emerged over the last several years.

Each chapter is broken down into sections exploring various topics of study. Examples are provided throughout the text, the end of each is indicated by the symbol \square . A problem set is found at the end of each chapter, and solutions to selected problems are provided in a separate section located toward the end of the book. Five appendixes are also provided. Appendix A provides a refresher in option pricing for readers who might do well with reacquainting themselves with concepts of basic option pricing theory. This is also the only appendix that includes a problem set (see the Solutions to Selected Problems section as well). Appendix B provides a very brief review of some basic topics germane to the analysis of fixed income securities. Appendix C delves into some particulars of day count and payment conventions used in the swaps market. Appendix D provides a brief review of mortgages and mortgage-backed securities, a market that has traditionally had a very close link with the swaps market. Finally, Appendix E provides a derivation of the normal model for the pricing of options and explores the relationship between the normal model and Black's model. At the beginning of the book a list of abbreviations contains some (but not all) terms used throughout the text.