MOORAD CHOUDHRY

AN INTRODUCTION TO BOND MARKETS

FOURTH EDITION

AN INTRODUCTION TO BOND MARKETS

Fourth Edition

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Moorad Choudhry

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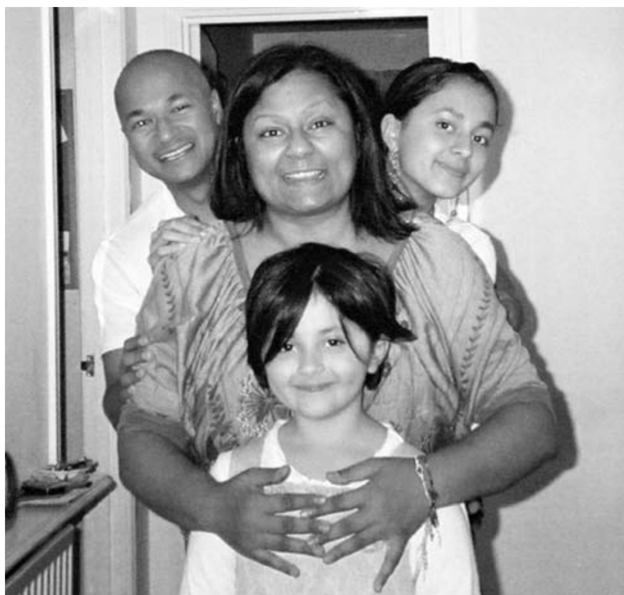

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FOREWORD

I have known Dr Choudhry for over a decade and he is the finest investment banker that I know. I don't mean that as an insult either! Two or three years ago there would have been little risk that my comments could be construed as an insult, but thanks to a few bad eggs and a heap of misguided public attention 'banker' is a rude word and banking is probably the last thing a young graduate wants as a career. That is a loss for us all, and I'm hoping that this book will change the direction of a few bright young minds who are heading otherwise straight to Google or Apple.

It is widely assumed that bankers caused the recession. This statement is taken for granted, politicians talk as though this is a well-established fact and that bankers' obscene bonus culture was the major driver. We have US senate hearings and UK government enquiries which move ahead on this assumption, all intent on fixing the banking bonus 'problem'. The thing is, once one wades through the products, the terminology and headline rhetoric, one can whittle down banking to a very simple business: banks lend money. Blaming a banker for lending money is like blaming an accountant for adding up a column of numbers.

Banks lend money and in doing so they take risks. There are no guarantees that every borrower will pay back their loan. Rather than ascribing the financial crash solely to bankers, shouldn't we also be asking why people stopped paying back their loans? The credit rating agencies gave many investment products high credit ratings. Banks were audited, regulated and risk-managed but no flags were raised. Government is rightly taking some media abuse for encouraging an economy built on debt, perhaps that is why they are so hasty in pointing a finger elsewhere. All of us encouraged the economic conditions under which lending thrived and it wasn't just in the UK. For instance, the US administration, under Presidents Clinton

and Bush, together with the Department of Housing and Urban Development, put pressure on banks to lend so that more people could buy homes, and of course it was in the US that the crisis began.

The banks and a select few of its senior bankers were obviously not blameless, but all this finger-pointing is so singular. An economic crisis is a complex event and sensational headlines isolate single causes. To focus solely on the size of bonus payouts rather than broader macroeconomic factors is like trying to change a desert into arable land with an umbrella and a watering can.

The business of banking, in fact any business, involves the taking of some risks. Dr Choudhry deals well with these risks explaining the fundamentals. There is much new material in this latest edition; for instance, in Chapter 8 Moorad presents a particularly sound analysis of the role credit-rating agencies play in the trading and pricing of bonds. I'm sure that the reader will enjoy this book and it will provide useful insight to the complexities of the financial systems.

Rod Pienaar
Executive Director, Prime Services
UBS AG, London

PREFACE

Here is how I began the Preface to the Third Edition of this book:

> *One hopes that my writing has progressed since the first edition of this book was published in 1999. Certainly the markets themselves have moved on, as the constant dynamic that is the world's fixed income markets results in new products and processes on an almost daily basis. It is a task in itself merely to keep up with new developments in bonds and financial engineering, let alone to write about them in a way that is of value to market practitioners. Still, as the character played by Kiefer Sutherland in the 1988 movie* Young Guns *said, 'Let's finish out the game!' We began the journey with the first edition, so let us continue it now with this much revised and (we hope!) improved third edition.*

Ignoring the quote from the movie, the above remains unchanged. In the four years since the third edition was published, we've gone from a bull market and seemingly unrestrained optimism, with the markets embracing structured finance securities and credit derivatives as their new best friend, to a major banking crisis and global recession. And the best friend is now, for some, the worst enemy. Thankfully this is a textbook on the bond markets, not a journalistic treatise on how good or bad they are. Of course, there is no argument, the debt capital markets and the banks are indispensable to worldwide economic and social development. But this book is not the place to debate this either way.

The fourth edition of this book builds on the format established with the first edition, a succinct, accessible description of fixed income instruments and their analysis. We include related derivative instruments such as interest rate swaps and futures, and credit derivatives. New material included in this edition is detailed below.

Given the size of the global bond markets, it would never be possible to cover every single instrument and application in a single book. Our intention is to cover the areas most important for beginners. This book is aimed at those with little or no previous understanding of or exposure to the bond markets; however, it also investigates the markets to sufficient depth to be of use to the more experienced practitioner. It is primarily aimed at front-office, middle-office and back-office banking and fund management staff who are involved to some extent with fixed income securities. Others including corporate and local authority treasurers, bank auditors and consultants, risk managers and legal department staff may also find the contents useful.

However, there is little or no description of specific markets, exchanges or trading conventions; such topics would result in a very large book and are abundantly covered in the existing literature. A detailed treatment is therefore left out, as required in a book of this size, but interested readers can access the references listed in the bibliography. All items listed have been read by the author, which serves to makes bibliographies relevant and not over-long.

In light of the financial crash of 2007–2008, certain products such as collateralised debt obligations (CDOs) fell out of favour, but they may well reacquire popularity once again. The 'great stride forward' in capital markets that I referred to in the third edition, the rise in synthetic credit markets, was blamed by some for the financial crash; of course, to imagine that a financial product was a direct causal factor of the crisis is nonsense. Nevertheless the market will no doubt be subject to further regulation and reform in the next few years. Again, such a topic is outside the scope of this book, we confine ourselves to the technical treatment.

New additions and updates in this fourth edition include:

- a look at how the financial crash of 2007–2008 affected the credit derivatives and securitisation markets, as well as the perception of credit ratings agencies;
- the iTraxx index credit derivative contract;
- an introduction to index-linked derivatives in the chapter on index-linked bonds;
- a look at in-house central bank-led deals in the chapter on asset-backed securities;
- a review of the different bond relative value measures used by portfolio managers, including the asset–swap spread and the

z-spread, and a summary of the fund manager's approach to value creation.

All chapters have been updated and include revisions and deletions where necessary.

In the Preface to the Third Edition I noted that a reader emailed me once with his thanks and appreciation, because apparently my books were the first in finance that incorporated Bloomberg, Reuters and other screens as exhibits in the text. I am not so sure myself, I remember seeing a Paul Wilmott book that also had such screens around about the same time as my books were coming out ... but irrespective of which authors were the first to adopt this particular idea, I am happy to have been of some small service to people such as he, students and practitioners alike. The global debt markets are far too important, and pivotal in global economic development and progress, for knowledge transfer and dissemination not to be a top priority of everyone that has an interest in them.

Finally, some acknowledgements ...

The first edition of this book grew out of material put together for the bond markets course run by the Securities Institute (now the Chartered Institute for Securities and Investment) in London. My thanks to Zena Doidge at the Institute for giving me the opportunity to teach this course back in 1999, and to Debra Wilson for suggesting that I turn the material into a book.

Thanks to Jeremy Shiers for pointing out some typo errors in the bond yield calculation spreadsheets in the last edition, which have now been corrected. Big thanks to Anuk Teasdale for assistance with graphics used in the first edition. And thanks as ever to the *Raynes Park Footy Boys* for their ongoing friendship and support.

All the best.

Moorad Choudhry
Surrey, England
6 April 2010

PREFACE TO THE FIRST EDITION

The bond markets are an important part of the global financial markets, and a vital conduit through which capital is raised and invested. Over the last two decades the growth in trading volumes has been accompanied by the introduction of ever-more sophisticated financial-engineering techniques, such that the bond markets today comprise trading in a large variety of structures. Banks can tailor packages to suit the most esoteric of requirements for their customers, so that bond cash flows and the hedging instruments available for holders of bonds can be far removed from the conventional fixed interest instruments that originally made up the market. Instruments are now available that will suit the needs of virtually all users of the financial markets, whether they are investors or borrowers.

The purpose of this book is to provide an introductory description and analysis of the bond markets as a whole. However, we seek to leave the reader with sufficient information and worked examples to enable him or her to be at ease with all the different aspects of the markets. Hence we begin by considering basic 'plain vanilla' bonds and elementary bond mathematics, before looking at the array of different instruments available. This includes an overview of off-balance sheet instruments and their uses. We also consider the analytical techniques used by the markets, and basic trading and hedging strategy.

This book is aimed at those with little or no previous understanding of or exposure to the bond markets; however, it investigates the markets to sufficient depth to be of use to more experienced practitioners. It is primarily aimed at front-office, middle-office and back-office banking and fund management staff who are involved to some extent in fixed interest markets. Others including

corporate and local authority treasurers and risk management and legal department staff may also find the contents useful. Comments on the text are welcome and should be sent to the author care of the Securities Institute (Services) Limited.

ABOUT THE AUTHOR

Moorad Choudhry has over 21 years experience in investment banking and capital markets. He was latterly Head of Treasury at Europe Arab Bank plc in London, and before that worked at KBC Financial Products, JPMorgan Chase Bank, Hambros Bank Limited, ABN Amro Hoare Govett Limited and the London Stock Exchange.

Moorad was educated at the University of Westminster and the University of Reading. He obtained his MBA from Henley Management College and his PhD from Birkbeck, University of London. He is Visiting Professor at the Department of Economics, London Metropolitan University; Senior Research Fellow at the ICMA Centre, University of Reading; a Fellow of the *ifs*-School of Finance; a Fellow of the Global Association of Risk Professionals, and a Fellow of the Chartered Institute for Securities and Investment. He is on the Editorial Board of the *Journal of Structured Finance* and on the Editorial Advisory Board of the American Securitization Forum.

Do not worry about your difficulties in mathematics. I can assure you mine are still greater.

– Albert Einstein (1879–1955)

Education never ends, Watson. It's a series of lessons, with the greatest for the last.

– *The Adventure of the Red Circle*, His Last Bow
Sir Arthur Conan Doyle (1859–1930)

Chapter 1

INTRODUCTION TO BONDS

Bonds are the basic ingredient of the world's debt-capital markets, which in turn are the cornerstone of the world's economy. Consider how many television news programmes contain a slot during which the newscaster informs viewers where the main stock market indexes closed that day and where key foreign exchange rates ended up. More usefully, the financial sections of most newspapers also indicate at what yield the government long bond closed. This coverage reflects the fact that bond prices are affected directly by economic and political events, and yield levels on certain government bonds are fundamental economic indicators. The yield level on the US Treasury long bond, for instance, mirrors the market's view on US interest rates, inflation, public-sector debt, and economic growth.

The media report the bond yield level because it is so important to the country's economy – as important as the level of the equity market and more relevant as an indicator of the health and direction of the economy. Because of the size and crucial nature of the debt markets, a large number of market participants, ranging from bond issuers to bond investors and associated intermediaries are interested in analysing them. This chapter introduces the building blocks of the analysis.

Bonds are debt instruments that represent cash flows payable during a specified time period. They are a form of debt, much like how a bank loan is a form of debt. The cash flows they represent are the interest payments on the loan and the loan redemption. Unlike commercial bank loans, however, bonds are tradeable in a secondary market. Bonds are commonly referred to as *fixed-income* instruments. This term goes back to a time when bonds paid fixed coupons each year. That is no longer necessarily the case. Asset-backed bonds, for instance, are issued in a number of tranches – related securities from the same issuer – each of which pays a different fixed or floating coupon. Nevertheless, this is still commonly referred to as the fixed-income market.

In the first edition of this book I wrote:

*Unlike bank loans however bonds can be **traded** in a market.*

Actually, the first part of this statement cannot really be said to be accurate anymore. There is a thriving secondary market, certainly for US dollar and pound sterling loans, in bank loans these days. However, it is viewed as a separate market, and is not as liquid as the