

Wiley Finance Series

Fixed Income Markets

Management, Trading and Hedging

Second Edition

MOORAD CHOUDHRY
DAVID MOSKOVIC
MAX WONG

Foreword by **OLDRICH MASEK**

MD, Global Securitized Products
JP Morgan Chase

WILEY

The Wiley Finance series contains books written specifically for finance and investment professionals as well as sophisticated individual investors and their financial advisors. Book topics range from portfolio management to e-commerce, risk management, financial engineering, valuation, and financial instrument analysis, as well as much more. For a list of available titles, visit our Web site at www.WileyFinance.com.

Founded in 1807, John Wiley & Sons is the oldest independent publishing company in the United States. With offices in North America, Europe, Australia, and Asia, Wiley is globally committed to developing and marketing print and electronic products and services for our customers' professional and personal knowledge and understanding.

Fixed Income Markets

Management, Trading, Hedging **Second Edition**

MOORAD CHOUDHRY
DAVID MOSKOVIC
MAX WONG

*With contributions from Suleman Baig, Zhuoshi Liu,
Michele Lizzio and Alexandru Voicu*

WILEY

Cover Design: Wiley

Cover Image: © iStock.com/Robin_Hood

Copyright © 2014 by Moorad Choudhry

First edition published by John Wiley & Sons in 2004.

Published by John Wiley & Sons Singapore Pte. Ltd.

1 Fusionopolis Walk, #07-01, Solaris South Tower, Singapore 138628

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as expressly permitted by law, without either the prior written permission of the Publisher, or authorization through payment of the appropriate photocopy fee to the Copyright Clearance Center. Requests for permission should be addressed to the Publisher, John Wiley & Sons Singapore Pte. Ltd., 1 Fusionopolis Walk, #07-01, Solaris South Tower, Singapore 138628, tel: 65-6643-8000, fax: 65-6643-8008, e-mail: enquiry@wiley.com.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor the author shall be liable for any damages arising herefrom.

Other Wiley Editorial Offices

John Wiley & Sons, 111 River Street, Hoboken, NJ 07030, USA

John Wiley & Sons, The Atrium, Southern Gate, Chichester, West Sussex, P019 8SQ, United Kingdom

John Wiley & Sons (Canada) Ltd., 5353 Dundas Street West, Suite 400, Toronto, Ontario, M9B 6HB, Canada

John Wiley & Sons Australia Ltd., 42 McDougall Street, Milton, Queensland 4064, Australia

Wiley-VCH, Boschstrasse 12, D-69469 Weinheim, Germany

Library of Congress Cataloging-in-Publication Data

Choudhry, Moorad.

Fixed income markets : management, trading and hedging / Moorad Choudhry, David Moskovic, Max Wong ; with contributions from Zhuoshi Liu and Alexandru Voicu. — Second edition.

pages cm. — (The Wiley finance series)

Includes index.

ISBN 978-1-118-17172-1 (hardback); ISBN 978-1-118-17174-5 (ebk); ISBN 978-1-118-17175-2 (ebk)

1. Fixed-income securities. I. Title.

HG4650.C447 2014
332.63'2044—dc23

2014007537

Author disclaimer:

The views, thoughts and opinions expressed in this book represent those of the authors in their individual private capacity, and should not in any way be attributed to The Royal Bank of Scotland plc or to Royal Bank of Scotland Group, or to Moorad Choudhry, David Moskovic, or Max Wong as representatives, officers, or employees of The Royal Bank of Scotland plc or Royal Bank of Scotland Group.

This book does not constitute investment advice, and its contents should not be construed as such. Any opinion expressed does not constitute a recommendation to any reader. The contents should not be considered as a recommendation to deal, and the authors do not accept liability for actions resulting from a reading of any material in this book.

Whilst every effort has been made to ensure accuracy, no responsibility for loss occasioned to any person acting or refraining from action as a result of any material in this book can be accepted by the authors, publisher, or any named person or corporate entity.

The material in this book is based on information that is considered reliable, but neither the authors nor the publisher warrant that it is accurate or complete, and it should not be relied on as such. Opinions expressed are current opinions only and are subject to change. The authors and publisher are not soliciting any action based upon this material. The authors and any named person or entity may or may not have a position in any capital market instrument described in this book, at the time of writing or subsequently. Any such position is subject to change at any time and for any reason.



For Lindsay . . .

YOU are the best thing that ever happened to me.

—Moorad Choudhry

Contents

[Foreword](#)

[Preface](#)

[Acknowledgments](#)

[About the Authors](#)

[PART ONE Introduction to Bonds](#)

[CHAPTER 1 The Bond Instrument](#)

[Bond-Market Basics](#)

[Capital Market Participants](#)

[Investors](#)

[World Bond Markets](#)

[Overview of the Main Bond Markets](#)

[Time Value of Money](#)

[Bond Pricing and Yield: The Traditional Approach](#)

[Bond Yield](#)

[Selected Bibliography and References](#)

[Notes](#)

[CHAPTER 2 Bond Instruments and Interest-Rate Risk](#)

[Duration, Modified Duration, and Convexity](#)

[Appendices](#)

[Appendix 2.1 Formal Derivation of Modified-Duration Measure](#)

[Appendix 2.2 Measuring Convexity](#)

[Appendix 2.3 Taylor Expansion of the Price/Yield Function](#)

[Selected Bibliography and References](#)

[Notes](#)

CHAPTER 3 Bond Pricing, Spot, and Forward Rates

Basic Concepts

Coupon Bonds

Bond Price in Continuous Time

Forward Rates

Term Structure Hypotheses

Evidence on the Expectations Hypothesis

Appendices

Appendix 3.1 The Integral

Appendix 3.2 The Derivation of the Bond Price Equation in Continuous Time

Notes

Selected Bibliography and References

CHAPTER 4 Interest-Rate Modelling

Background

One-Factor Term-Structure Models

Choosing a Term-Structure Model

Appendix

Appendix 4.1 Geometric Brownian Motion

Notes

Selected Bibliography and References

CHAPTER 5 Fitting the Yield Curve

Yield-Curve Smoothing

Non-parametric Methods

Comparing Curves

Yield Curve Construction: A Practical Guide

Appendices

Appendix 5.1 Linear Regression: Ordinary Least Squares

[Appendix 5.2 Regression Splines](#)

[Notes](#)

[Selected Bibliography and References](#)

[PART TWO Selected Market Instruments](#)

[CHAPTER 6 The Money Markets](#)

[Overview](#)

[Securities Quoted on a Yield Basis](#)

[The Repo Instrument](#)

[Money-Market Derivatives](#)

[Short-Term Interest-Rate Futures](#)

[Appendices](#)

[Appendix 6.1](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 7 Hybrid Securities and Structured Securities](#)

[Floating-Rate Notes](#)

[Indexed Amortising Note](#)

[Synthetic Convertible Note](#)

[Interest-Differential Notes](#)

[Convertible Bonds](#)

[Contingent Convertible Securities](#)

[References](#)

[CHAPTER 8 Bonds with Embedded Options and Option-Adjusted Spread Analysis](#)

[Understanding Embedded-Option Elements in a Bond](#)

[The Binomial Tree of Short-Term Interest Rates](#)

[Price Volatility of Bonds with Embedded Options](#)

[Correct Way to Risk-Manage a Callable Note](#)

[Appendices](#)

[Appendix 8.1 Calculating Interest Rate Paths
Using Microsoft Excel](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 9 Inflation-Indexed Bonds and Derivatives](#)

[Basic Concepts](#)

[Index-Linked Bond Yields](#)

[Inflation-Indexed Derivatives](#)

[Applications](#)

[Appendices](#)

[Appendix 9.1 Current Issuers of Public-Sector
Indexed Securities](#)

[Appendix 9.2 U.S. Treasury Inflation-Indexed
Securities \(TIPS\)](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 10 Introduction to Securitisation and Asset-Backed Securities](#)

[The Concept of Securitisation](#)

[The Process of Securitisation](#)

[Securitising Mortgages](#)

[ABS Structures: A Primer on Performance Metrics
and Test Measures](#)

[The Securitisation Market Post-2007](#)

[Special Purpose Vehicles \(SPVs\)](#)

[Summary and Conclusions](#)

[Notes](#)

[Selected Bibliography and References](#)

[PART THREE Derivative Instruments](#)

[Recommended Reading](#)

[CHAPTER 11 Forwards and Futures Valuation](#)

[Introduction](#)

[Forwards](#)

[Futures](#)

[Forwards and Futures](#)

[Cash Flow Differences](#)

[Relationship between Forward and Future Price](#)

[The Forward-Spot Parity](#)

[The Basis and Implied Repo Rate](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 12 Bond Futures Contracts](#)

[Background](#)

[Bond Futures Contracts](#)

[Futures Pricing](#)

[Hedging Using Futures](#)

[The Margin Process](#)

[Appendix](#)

[Appendix 12.1 The Conversion Factor for the Long Gilt Future](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 13 Swaps](#)

[Interest-Rate Swaps](#)

[Generic Swap Valuation](#)

[Asset Swaps](#)

[An Overview of Interest-Rate Swap Applications](#)

[Bloomberg Screens](#)

[Appendix](#)

[Appendix 13.1 Calculating Futures Strip Rates and Implied Swap Rates](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 14 Credit Derivatives I: Instruments and Applications](#)

[Credit Risk](#)

[Credit Risk and Credit Derivatives](#)

[Applications](#)

[Credit Event](#)

[Credit Derivative Instruments](#)

[Credit-Linked Notes](#)

[Sidebar: Uncollateralised CDS](#)

[The iTraxx Index Note](#)

[Applications for Portfolio Managers](#)

[Risks in Credit Default Swaps](#)

[Big Bang in CDS](#)

[Conclusion](#)

[Appendix](#)

[Appendix 14.1 Bond Credit Ratings](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 15 Credit Derivatives II: Pricing, Valuation, and the Basis](#)

[Introduction](#)

[Asset Swap Pricing](#)

[Pricing Models](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 16 Options I](#)

[Background](#)

[Option Instruments](#)

[Option Pricing: Setting the Scene](#)

[Option Pricing](#)

[The Black-Scholes Option Model](#)

[Interest-Rate Options and the Black Model](#)

[Comment on the Black-Scholes Model](#)

[A Final Word on Option Models](#)

[Appendices](#)

[Appendix 16.2 Lognormal Distribution of Returns](#)

[Appendix 16.3 Black-Scholes Model in Microsoft Excel](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 17 Options II](#)

[Behaviour of Option Prices](#)

[Assessing Time Value](#)

[American Options](#)

[Measuring Option Risk: The Greeks](#)

[Delta](#)

[Gamma](#)

[Theta](#)

[Vega](#)

[Rho](#)

[Lambda](#)

[The Option Smile](#)

[Notes](#)

[Selected Bibliography and References](#)

[PART FOUR Bond Trading and Hedging](#)

[CHAPTER 18 Value-at-Risk and Credit VaR](#)

[Introducing Value-at-Risk](#)

[Explaining Value-at-Risk](#)

[Value-at-Risk for Fixed-Income Derivative Instruments](#)

[Stress Testing](#)

[Value-at-Risk Methodology for Credit Risk](#)

[Appendix 18.1 Assumption of Normality](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 19 Government Bond Analysis, the Yield Curve, and Relative-Value Trading](#)

[The Determinants of Yield](#)

[Practical Uses of Redemption Yield and Duration](#)

[Implied Spot Rates and Market Zero-Coupon Yields](#)

[Yield-Spread Trades](#)

[Coupon Spread](#)

[Butterfly Trades](#)

[Case Study: Spread Trade](#)

[Notes](#)

[Selected Bibliography and References](#)

[CHAPTER 20 Approaches to Trading and Hedging](#)

[Futures Trading](#)

[Yield Curves and Relative Value](#)

[Yield-Spread Trades](#)

[Hedging Bond Positions](#)

[Bond Analysis Using Spot Rates and Forward Rates in Continuous Time](#)

[Bond Prices as a Function of Spot and Forward Rates](#)

[Appendices](#)

[Appendix 20.1 Summary of Derivation of Optimum Hedge Equation](#)

[Appendix 20.2 Forward-Rate Structure in Conventional Yield-Curve Environment](#)

[Notes](#)

[Selected Bibliography](#)

[CHAPTER 21 Derivatives Risk Management: Convexity, Collateral, and Correlation](#)

[Abstract](#)

[Why Correlation Occurs in the Markets](#)

[Correlation and Causation](#)

[How Can We Define Correlation?](#)

[Measuring Correlation](#)

[Correlation Swaps, Pricing, and Their Risks](#)

[Quantos, Pricing, and their Risks](#)

[Differences between Instantaneous and Terminal Volatilities and Correlations](#)

[Hedging a Portfolio of Correlation Swaps and Quantos](#)

[Uncollateralised Derivatives and Note Discounting](#)

[Explanation of the Risk-Neutral Measure](#)

[What Does Discounting Really Represent?](#)

[Pricing an Uncollateralised Cash Flow](#)

[Graph of PV from Different CSAs](#)

[Senior Unsecured Bonds: Equivalence to
Uncollateralised Derivatives](#)

[Funding a Trading Book](#)

[A Diversion: St. Petersburg Paradox and Credit
Risk](#)

[Making Money for Whom?](#)

[Chapter Summary](#)

[APPENDIX A Statistical Concepts](#)

[Mean and Standard Deviation](#)

[APPENDIX B Basic Tools](#)

[Summation and Product Operators](#)

[Standard Brownian Motion and the Dynamics of the
Asset-Price Process](#)

[The Integral Calculus](#)

[Stochastic Integrals](#)

[APPENDIX C Introduction to the Mathematics of Fixed-
Income Pricing](#)

[Bond Pricing](#)

[Yield to Maturity \(YTM\)](#)

[Expectation Hypothesis](#)

[Notes](#)

[References](#)

[APPENDIX D About the Companion Website](#)

[Description of the Content](#)

[Glossary](#)

[Index](#)

End User License Agreement

List of Tables

Chapter 1

Table 1.1

Table 1.2

Table 1.3

Table 1.4

Table 1.5

Chapter 2

Table 2.1

Table 2.2

Chapter 3

Table 3.1

Table 3.2

Chapter 6

Table 6.1

Table 6.2

Table 6.3

Chapter 7

Table 7.1

Table 7.2

Table 7.3

Table 7.4

Table 7.5

Table 7.6

Table 7.7

Chapter 8

Table 8.1

Table 8.2

Table 8.3

Table 8.4

Table 8.5

Chapter 9

Table 9.1

Table A9.1.1

Chapter 10

Table 10.1

Table 10-2A

Table 10-2B

Chapter 11

Table 11.1

Chapter 12

Table 12.1

Table 12.2

Table 12.3

Chapter 13

Table 13.1

Table 13.2

Table 13.3

Table 13.4

Table 13.5

Chapter 15

Table 15.1

Table 15.2

Table 15.3

Table 15.4

Chapter 16

Table 16.1

Chapter 17

Table 17.1

Table 17.2

Chapter 18

Table 18.1

Table 18.2

Table 18.3

Table 18.4

Table 18.5

Table 18.6

Table 18.7

Table 18.8

Table 18.9

Table 18.10

Table 18.11

Table 18.12

Table 18.13

Chapter 19

Table 19.1

Table 19.2

Table 19.3

Table 19.4

Table 19.5

Table 19.6

Table 19.7

Table 19.8

Table 19.9

Table 19.10

Chapter 20

Table 20.1

Table 20.2

Table 20.3

Table 20.4

Appendix A

Table AA.1

List of Illustrations

Chapter 1

FIGURE 1.1 Bloomberg Screen DES Showing Details of $4\frac{5}{8}\%$ 2010 Issued by Republic of Singapore as of 20 October 2003

FIGURE 1.2 Hypothetical Discount Function

FIGURE 1.3 Bloomberg YA Page for Yield Analysis

FIGURE 1.4 The Price/Yield Relationship

Chapter 2

FIGURE 2.1 Approximation of the Bond Price Change Using Modified Duration

Chapter 3

FIGURE 3.1 U.S. Treasury Zero-Coupon Yield Curve, December 2013

FIGURE 3.2 UK Gilt Zero-Coupon Yield Curve, December 2013

FIGURE 3.3 Chinese Government Yield Curve, December 2013

FIGURE 3.4A Hypothetical Zero-Coupon and Forward Yield Curves

FIGURE 3.4B Hypothetical Spot and Forward Yield Curves

FIGURE A3.1 Calculating Area Using the Integral

Chapter 4

FIGURE A4.1 Evolution of Brownian or Weiner Process

Chapter 5

FIGURE 5.1 Gilt Gross Redemption Yields, 12th June 2000

FIGURE 5.2 Discount Factors from Gilt Prices, 12th June 2000

FIGURE 5.3 Zero-Coupon (spot) and Forward Rates Obtained from Gilt Yields, 12th June 2000

FIGURE 5.4 Linear Interpolation of Bond Yields,
26th June 1997

FIGURE 5.5 Spot and Forward Rates Implied from
Figure 5.4

FIGURE 5.6 Cubic Spline with Knot Points at 0, 2, 5,
10, and 25 Years

FIGURE 5.7 EUR-USD Cross-Currency Basis History
1998–2012

FIGURE 5.8 Cross-Currency Swap: Initial Payment
of Principal

FIGURE 5.9 Interest Payments

FIGURE 5.10 Final Payment of Principal

FIGURE 5.11 Hybrid Discount Yield Curve

FIGURE A5.1.1 Regression Line Passing through
Values of X and Y

FIGURE A5.2.1 Piecewise Linear Regression:
Unsuitable for Yield Curve Construction

FIGURE A5.2.2 Knot Points within a Spline Function

Chapter 6

FIGURE 6.1 U.S. Money Market Rates

FIGURE 6.2 Philippines Money Market Prime Rates

FIGURE 6.3 Money Market Yield Curves on Screen
MMCV

FIGURE 6.4 Malaysian Market Rates on BTMM

FIGURE 6.5 Taiwan Money Market Rates on BTMM

FIGURE 6.6 Classic Repo Transaction for 100-Worth
of Collateral Stock

FIGURE 6.7 Diagram of Classic Repo Trade

FIGURE 6.8 Bloomberg Screen RRRA for Classic Repo Transaction, Trade Date 5 July 2000

FIGURE 6.9 Bloomberg Screen for the Classic Repo Trade Illustrated in Figure 6.10

FIGURE 6.10 Corporate Treasury Classic Repo

FIGURE 6.11 Sell/Buy-Back Transaction

FIGURE 6.12 Bloomberg Screen BSR for Sell/Buy-Back Trade in 5.75% 2009, Trade Date 5 July 2000

FIGURE 6.13 Bloomberg Screen BSR Page 2 for Sell/Buy-Back Trade in 5.75% 2009 Gilt Shown in Figure 6.12

FIGURE 6.14 Tri-Party Repo Structure

FIGURE 6.15 Tri-Party Repo Flow

FIGURE 6.16 Tri-Party Repo Flow

FIGURE 6.17 Bloomberg Screen REM; Used for Repo-to-Maturity Analysis, for UK Treasury 7% 2001 on 14 August 2001

FIGURE 6.18 Bloomberg Screen RRM, Used for Reverse Repo-to-Maturity Analysis, for UK Treasury 7% 2001 on 14 August 2001

FIGURE 6.19 Margin Call

FIGURE 6.20 Key Dates in an FRA Trade

FIGURE 6.21 Rates Used in FRA Pricing

FIGURE 6.22 Bloomberg Screen DES Showing Eurodollar Contract Terms

FIGURE 6.23 Bloomberg Page TED, Showing Futures Strip Hedge for £10 Million Position in UK Gilt 6.75% 2004, as of 24 March 2004

FIGURE 7.1 IAN Hedge Arrangement

FIGURE 7.2 Convertible Bond and Conversion Premium

FIGURE 7.3 Underlying Equity Price Binomial Tree

FIGURE 7.4 Binomial Price Outcome for Call Option

FIGURE 7.5 Underlying Share Price Tree

FIGURE 7.6 Conventional Bond Price Tree

FIGURE 7.7 Convertible Bond Price Tree

FIGURE 7.8 Convertible Bond Price Sensitivity

Chapter 8

FIGURE 8.1 Two-Way Interest-Rate Projection

FIGURE 8.2 Initial Price Tree

FIGURE 8.3 One-Year Binomial Lattice

FIGURE 8.4 Binomial Path for Option Value

FIGURE 8.5 Two-Period Binomial Tree

FIGURE 8.6 Recombining Binomial Tree

FIGURE 8.7 Interest-Rate Tree

FIGURE 8.8 Bond Price Tree

FIGURE 8.9 Embedded Option Price Tree

FIGURE 8.10 Final Price Tree

FIGURE 8.11 Projected Prices for Callable and Conventional Bonds with Identical Coupon and Final Maturity Dates

FIGURE 8.12 Expected Interest Rate Paths under Conditions of Uncertainty

FIGURE 8.13 Impact of a Call Option on the Price/Yield (convexity) Profile of a Corporate Bond

FIGURE 8.14 Yield Curves Illustrating OAS Yield Spread

Chapter 9

FIGURE 9.1 The Indexation Lag

FIGURE 9.2 Bloomberg Page YA Showing Yield Calculation for U.S. 2% 2014 TIP Security, as of 15 March 2004

FIGURE 9.3 UK Implied Forward Inflation Rates during 1998–99

FIGURE 9.4 Inflation Derivatives Volumes, 2006–2009

FIGURE 9.5 Synthetic Index-Linked Bond

FIGURE 9.6 Year-on-Year Inflation Swap

FIGURE 9.7 Illustration of a TIPS Swap

FIGURE 9.8 Break-Even Inflation Swap

Chapter 10

FIGURE 10.1 The Securitisation Process

FIGURE 10.2 Cash Flow Waterfall (priority of payments)

FIGURE 10.3 Master Trust Structure

FIGURE 10.4 Sample Weighted Average Life (WAL) Calculation

FIGURE 10.5 UK RMBS Spreads over Bank Debt and Covered Bonds

FIGURE 10.6 Bloomberg Page DES for European Bank CLO

FIGURE 10.7 U.S. ABS Sector Breakdown, 2009

FIGURE 10.8 U.S. Floating-Rate Spreads, 2008–2009

FIGURE 10.9 Vanilla Bond and Repackaging Structure

FIGURE 10.10 Repackaging Bank Own Debt

FIGURE 10.11 Vanilla Bond and Negative Basis Repack

FIGURE 10.12 Vanilla Bond CLN Repack

Chapter 11

FIGURE 11.1 Forward Contract Profit/Loss Profile

FIGURE 11.2 Forward Strategy.

FIGURE 11.3 Algebraic Proof of Forward Price

Chapter 12

FIGURE 12.1 Bond Futures Delivery Quotes, Bloomberg Page DLV, 2 December 2013

Chapter 13

FIGURE 13.1 Cash Flows for Vanilla Interest-Rate Swap

FIGURE 13.2 Libor-OIS Spread, 2002–2008

FIGURE 13.3 Asset Swap

FIGURE 13.4 Example of Bloomberg Asset Swap Calculator Screen

FIGURE 13.5 SONIA Average Rate Minus BoE Repo Rate, 1999–2000

FIGURE 13.6 Tullet U.S. Dollar Deposit Rates, 10 November 2003

FIGURE 13.7 Garban ICAP U.S. Dollar OIS Rates, 10 November 2003

FIGURE 13.8 Illustration of Interest Basis Mismatch Hedging Using OIS Instrument

FIGURE 13.9 Changing Liability from Floating- to Fixed-Rate

FIGURE 13.10 Changing Interest Basis

FIGURE 13.11 Transforming Floating-Rate Asset to Fixed-Rate

FIGURE 13.12 PVBP for Interest-Rate Swap

FIGURE 13.13 PVBP of a Five-Year Swap and Fixed-Rate Bond

FIGURE 13.14 Screen SMKR on Bloomberg, Tullet USD Swaps Page, 9 February 2004

FIGURE 13.15 Screen SMKP on Bloomberg, Tullet USD OIS and FRA Rates Page, 9 February 2004

FIGURE 13.16 Tullett Australian Dollar Composite Page

FIGURE 13.17 Tullett Singapore Dollar Composite Page

FIGURE 13.18 Tullett Taiwan Dollar Composite Page

FIGURE 13.19A Bloomberg Screen BCSW, Swap Valuation Page, Calculation on 22 March 2004

FIGURE 13.19B Bloomberg Screen BCSW, Page Forward to Show Swap Cash Flows

FIGURE 13.20A Bloomberg Screen SWPM, User-Selected Swap Calculator on 22 March 2004 to Analyse Same Swap Shown in Figure 13.19

FIGURE 13.20B Bloomberg Screen SWPM, Page Forward to Show Swap Curve

FIGURE 13.21A Bloomberg Screen OVSW, Swaption Valuation Screen for SGD Swap on 22 March 2004, Using Black 76 Model

FIGURE 13.21B Bloomberg Screen OVSW, Swaption Valuation Screen Using Black-Derman-Toy Model

Chapter 14

FIGURE 14.1 U.S.-Dollar Bond Yield Curves, December 2013

FIGURE 14.2 Credit Default Swap

FIGURE 14.3 Investment-Grade Credit Default Swap Levels 2013

FIGURE 14.4 Total Return Swap

FIGURE 14.5 Spreadsheet Showing Basket of Bonds Used in TRS Funding Trade

FIGURE 14.6 Spreadsheet Showing Basket of Bonds at TRS Re-Set Date plus Performance and Interest Payments Due from Each TRS Counterparty

FIGURE 14.7 TRS Basket Value after Addition of New Bond

FIGURE 14.8 Comparing FTD Correlation Models

FIGURE 14.9 Incorrect Cash Flow Diagram for FR CLN and Hedge

FIGURE 14.10 Correct Approach to FR CLN Hedge

FIGURE 14.11 Day 1 Portfolio: Dynamic Replication of Uncollateralised Vanishing CDS

FIGURE 14.12 Portfolio Rehedging

FIGURE 14.13 FR CLN and Unwind Costs on Issuer and Reference Default

FIGURE 14.14 Static Hedge Portfolio, Cash Flow Deposit with Treasury Desk

FIGURE 14.15 Dynamically Hedged Portfolio

FIGURE 14.16 Spread Widening Impact

FIGURE 14.17 Bloomberg Screen DES for iTraxx Note, 2 December 2013

FIGURE 14.18 Reducing Credit Exposure

FIGURE 14.19 Total Return Swap in Capital-Structure Arbitrage

FIGURE 14.20 Bloomberg CDS Pricing Screenshot

Chapter 15

FIGURE 15.1 Credit Default Swap and Asset-Swap Hedge

FIGURE 15.2 Credit-Default Swap Gross Notional Outstanding

FIGURE 15.3(i) Credit Agricole CDS Basis, August 2007

FIGURE 15.3(ii) Credit Agricole CDS Basis, November 2010

Chapter 16

FIGURE 16.1 Payoff Profile for a Bond Futures Contract

FIGURE 16.2 Payoff Profile for Call-Option Contract

FIGURE 16.3 Basic Option Payoff Profiles

FIGURE A16.3.1 Microsoft Excel Calculation of Vanilla Option Price

Chapter 17

FIGURE 17.1 Time Value versus Intrinsic Value