

C O N T E N T S



Preface xxiii
Acknowledgments xxvi
Contributors xxvii

PART ONE

BACKGROUND

Chapter 1

Overview of the Types and Features of Fixed Income Securities 3

Frank J. Fabozzi, Michael G. Ferri, and Steven V. Mann

Bonds 3
Preferred Stock 15
Residential Mortgage-Backed Securities 16
Commercial Mortgage-Backed Securities 17
Asset-Backed Securities 17
Covered Bonds 18
Key Points 18

Chapter 2

Risks Associated with Investing in Fixed Income Securities 21

Ravi F. Dattatreya, Frank J. Fabozzi, and Sergio M. Focardi

Interest-Rate Risk 22
Reinvestment Risk 23
Call/Prepayment Risk 24
Credit Risk 25
Inflation, or Purchasing-Power, Risk 27
Liquidity Risk 27
Exchange-Rate, or Currency, Risk 28
Volatility Risk 29
Political or Legal Risk 29

Event Risk	30
Sector Risk	30
Other Risks	30
Statistical Measures of Portfolio Risk: Standard Deviation, Skewness, and Kurtosis	30
Tracking Error Risk	31
Key Points	32

Chapter 3

Bond Market Indexes 33

Frank K. Reilly and David J. Wright

Uses of Bond Indexes	33
Building and Maintaining a Bond Index	35
Description of Alternative Bond Indexes	36
Risk/Return Characteristics	40
Correlation Relationships	45
Key Points	48

Chapter 4

Electronic Trading for Fixed Income Markets 51

Marshall Nicholson

Overall Bond Market Growth	51
The Rise of Electronic Trading	52
The Impact of Regulatory Requirements	55
Shift to a Fee-Based Broker-Dealer Revenue Model	56
Universe of Electronic Trading Platforms	57
Current Technologies	59
Market Data and the Aggregation of Fixed Income ECNs	61
Retail-Fixed Income Market Participation	62
Retail Access to Individual Bonds	63
Fixed Income Pricing	66
Key Points	67

Chapter 5

Macro-Economic Dynamics and the Corporate Bond Market 69

Steven I. Dym

The Macro-Economy	69
Corporate Profits	73
Interest Rates	73
The Central Bank	74
Important Considerations	75
The Yield Curve	77
The Spread Curve	80

Cyclicality of Credit Spreads	81
Stagflation	83
Correlation and Capital Structure	84
Key Points	87

Chapter 6

Bond Pricing, Yield Measures, and Total Return 89

Frank J. Fabozzi

Bond Pricing	89
Conventional Yield Measures	102
Total Return Analysis	113
Key Points	120

Chapter 7

Measuring Interest-Rate Risk 123

Frank J. Fabozzi, Gerald W. Buetow, Jr., Robert R. Johnson, and Brian J. Henderson

The Full-Valuation Approach	124
Price Volatility Characteristics of Bonds	128
Duration	137
Modified Duration versus Effective Duration	143
Convexity	149
Price Value of a Basis Point	164
The Importance of Yield Volatility	165
Key Points	166

Chapter 8

The Structure of Interest Rates 169

Frank J. Fabozzi

The Base Interest Rate	169
Risk Premium	170
The Term Structure of Interest Rates	173
Key Points	189

PART TWO

GOVERNMENT SECURITIES AND CORPORATE DEBT OBLIGATIONS

Chapter 9

U.S. Treasury Securities 193

Michael J. Fleming and Frank J. Fabozzi

Types of Securities	194
The Primary Market	195

The Secondary Market	199
Zero-Coupon Treasury Securities	204
Acknowledgments	205
Key Points	205

Chapter 10

Agency Debt Securities 207

Mark O. Cabana and Frank J. Fabozzi

Agency Debt Market Overview	208
Types of Agency Debt Securities	211
The Primary Market	214
The Secondary Market	215
Agency Debt Issuance	215
Issuing Agencies	217
Large, Active Issuers	218
Smaller, Active Issuers	220
Nonactive Issuers and Recently Retired GSEs	221
Acknowledgments	223
Key Points	223

Chapter 11

Municipal Bonds 225

Sylvan G. Feldstein, Frank J. Fabozzi, Alexander Grant, and David Ratner

Features of Municipal Securities	227
Types of Municipal Obligations	229
The Commercial Credit Rating of Municipal Bonds	238
Municipal Bond Insurance	244
Valuation Methods	245
Tax Provisions Affecting Municipals	246
Yield Relationships within the Municipal Bond Market	249
Primary and Secondary Markets	251
Bond Indexes	253
Official Statement	254
Regulation of the Municipal Securities Market	254
Key Points	257

Chapter 12

Corporate Bonds 259

Frank J. Fabozzi, Steven V. Mann, and Adam B. Cohen

The Corporate Trustee	260
Some Bond Fundamentals	261
Security for Bonds	264
Alternative Mechanisms to Retire Debt before Maturity	270

Credit Risk	276
Event Risk	279
High-Yield Bonds	281
Default Rates and Recovery Rates	283
Medium-Term Notes	285
Key Points	286

Chapter 13

Leveraged Loans 289

Stephen J. Antczak, Frank J. Fabozzi, and Jung Lee

Syndicated Bank Loans	290
Loan Structure	291
Loan Terms	292
Recovery Rates	294
Secondary Market	295
Key Points	297

Chapter 14

Convertible Securities and Their Investment Application 299

Jonathan L. Horne and Chris P. Dialynas

Basic Characteristics of Convertible Securities and Key Terms	299
Overview of Convertible Bond Valuation and Risk Metrics	304
Primary Investors in Convertible Bonds	309
Motivations behind the Issuance of Convertible Securities	312
Key Points	314

Chapter 15

Structured Notes and Credit-Linked Notes 315

John D. Finnerty and Rachael W. Park

Structured Notes	316
Credit-Linked Notes	329
Key Points	336

Chapter 16

Private Money Market Instruments 337

Frank J. Fabozzi and Steven V. Mann

Commercial Paper	337
Bankers Acceptances	340
Large-Denomination Negotiable CDs	343
Repurchase Agreements	345
Federal Funds	350
Key Points	351

Chapter 17

Floating-Rate Securities 353

Frank J. Fabozzi and Steven V. Mann

- General Features of Floaters and Major Product Types 354
- Call and Put Provisions 356
- Spread Measures 357
- Price Volatility Characteristics of Floaters 358
- Portfolio Strategies 362
- Key Points 363

Chapter 18

Inflation-Linked Bonds 365

John B. Brynjolfsson

- Mechanics and Measurement 367
- Marketplace 373
- Valuation and Performance Dynamics 374
- Investors 375
- Issuers 380
- Other Issues 382
- Key Points 383

Chapter 19

International Bond Markets and Instruments 385

Karthik Ramanathan

- Overview and Scope of International Bond Markets 385
- The Instruments: Domestic, Euro, and Foreign 387
- Dollar-Denominated International Bonds 389
- Non-Dollar-Denominated Debt International Bonds 397
- International Fixed Income and Understanding Currency Risk 401
- Key Points 406

Chapter 20

Emerging Markets Debt 409

Jane Sachar Brauer

- The Debt Universe 409
- Emerging Markets Debt Performance History 413
- Brady Bonds 417
- Defaults, Exchanges, Restructurings, Workouts, and Litigation 422
- Derivatives 432
- Credit-Linked Notes (CLNs) 434
- Valuation Methods 435
- Conclusion 437

Collateralized Brady Bonds 437
Noncollateralized Brady Bonds 438

Chapter 21

Fixed Income Exchange Traded Funds 439

Matthew Tucker and Stephen Laipply

Investment Characteristics 440
Fixed Income ETF Management 447
Fixed Income ETF Characteristics and Mechanics 448
Trading Behavior: A Closer Look at Premiums and Discounts 453
Key Points 456

Chapter 22

Covered Bonds 459

Vinod Kothari

Covered Bonds: From Europe to the Rest of the World 460
Understanding Covered Bonds 460
Structure of Covered Bonds 461
Cover Assets and Credit Enhancements 466
Asset/Liability Mismatches and Liquidity Risk 467
Ratings of Covered Bonds 469
Covered Bonds and Securitization 469
Accounting for Covered Bonds 472
Key Points 472

Chapter 23

Nonconvertible Preferred Stock 475

Steven V. Mann

Preferred Stock Issuance 476
Trust Preferred 478
Preferred Stock Ratings 478
Tax Treatment of Dividends 479
Key Points 480

PART THREE

SECURITIZED PRODUCTS

Chapter 24

An Overview of Mortgages and the Mortgage Market 483

Anand K. Bhattacharya and William S. Berliner

Product Definition and Terms 484
Mechanics of Mortgage Loans 488
The Mortgage Industry 492

Generation of Mortgage Lending Rates	496
Component Risks of Mortgage Products	502
Key Points	507

Chapter 25

Agency Mortgage-Backed Securities 509

Andrew Davidson, Anne Ching, and Eknath Belbase

Mortgage Loans	509
History of Secondary Mortgage Market	513
Agency Pool Programs	515
Trading Characteristics	518
Prepayment and Cash-Flow Behavior	523
Prepayment Conventions	523
Sources of Prepayments	525
Prepayment Models	530
Valuation	531
Key Points	535

Chapter 26

Agency Collateralized Mortgage Obligations 537

Alexander Crawford

The CMO Market	537
The Reasons Why CMOs Exist	538
CMO Tranche Types	539
Agency versus Nonagency CMOs	558
Agency CMO Analysis	559
Key Points	566

Chapter 27

The Effect of Agency CMO PAC Bond Features on Performance 569

Linda Lowell

The Term Structure of CMO Yields	570
Collars and Collateral	572
Interaction of Collars and Collateral	574
PAC Collar Drift	577
When the PAC Breaks	578
Windows	578
Lockout	580
Is There a Z in the Deal?	581
Effect of Jump-Z and VADM Structures on PAC Bonds	584
Priority to Receive Excess Cash Flows	585
The Option Costs of PAC Features	585
Key Points	592

Chapter 28

Agency CMO Z-Bonds 593

Linda Lowell

- The Basic Accrual Structure 594
- How the Z Interacts with Other Bonds in the Structure 597
- CMOs with PACs and a Z-Bond 600
- Performance of Z-Bonds 603
- More Fun with Accrual Bonds 604
- PAC Zs 605
- Structures with More Than One Z-Bond 605
- Key Points 611

Chapter 29

Support Bonds with Schedules in Agency CMO Deals 613

Linda Lowell

- Support Bond Basics 614
- Support TAC Bonds 618
- Reverse TACs 621
- Layered PAC Bonds 624
- Summary of Average Life Volatilities 627
- Key Points 628

Chapter 30

Stripped Mortgage-Backed Securities 629

Cyrus Mohebbi, Gary Li, Todd White, and David Kwun 629

- Overview of the SMBS Market 630
- Investment Characteristics 633
- Key Points 642

Chapter 31

Nonagency Residential Mortgage-Backed Securities 645

Dapeng Hu and Robert Goldstein

- Market Overview 647
- Collateral 652
- Capital Structure 662
- Housing Market 670
- Mortgage Modification 673
- Relative Value and Risk Analysis 675
- Key Points 679

Chapter 32

Commercial Mortgage-Backed Securities 681

Wayne M. Fitzgerald II and Mark D. Patrowitz

The Collateral Pool	683
CMBS Trust Structure	692
Transaction Participants	694
Transaction Features	695
Market Development	700
Modeling	701
Key Points	705

Chapter 33

Credit Card Asset-Backed Securities 707

John McElravey

Securitization of Credit Card Receivables	707
The Credit Card ABS Life Cycle	712
Cash-Flow Allocations	716
Credit and Investment Considerations	718
Key Points	725

Chapter 34

Securities Backed by Auto Loans and Leases, Equipment Loans and Leases, and Student Loans 727

John McElravey

Securitization in Brief	727
Auto Loans and Leases	730
Equipment Loans and Leases	732
Student Loans	733
Key Points	736

Chapter 35

Collateralized Loan Obligations 737

Frank J. Fabozzi

Assets	737
Capital Structure	738
Creation Purpose	739
Credit Structures	739
Key Points	741

PART FOUR

TERM STRUCTURE OF INTEREST RATES

Chapter 36

Overview of Forward Rate Analysis 745

Antti Ilmanen

- Computation of Par, Spot, and Forward Rates 746
- Main Influences on the Yield-Curve Shape 749
- Using Forward Rate Analysis in Yield-Curve Trades 757
- Key Points 767

Chapter 37

A Framework for Analyzing Yield-Curve Trades 769

Antti Ilmanen

- Forward Rates and Their Determinants 770
- Decomposing Expected Returns of Bond Positions 777
- Key Points 795

Chapter 38

Empirical Yield-Curve Dynamics and Yield-Curve Exposure 797

Wesley Phoa

- Fundamental Determinants of Yield-Curve Dynamics 797
- Empirical Analysis of Yield-Curve Dynamics 805
- Beyond Level and Slope Risk 816
- Key Points 823

Chapter 39

Term Structure Modeling with No-Arbitrage Interest Rate Models 825

Gerald W. Buetow, Jr., and Brian J. Henderson

- Introduction to Models of the Short Rate 826
- Binomial Interest Rate Lattices 831
- Trinomial Lattice 851
- Key Points 854

PART FIVE

VALUATION MODELING

Chapter 40

Valuation of Bonds with Embedded Options 857

Frank J. Fabozzi, Andrew Kalotay, and Michael Dorigan

- The Interest Rate Lattice 858
- Calibrating the Lattice 862
- Using the Lattice for Valuation 866
- Fixed-Coupon Bonds with Embedded Options 866
- Valuation of Two More Exotic Structures 871
- Extensions 875
- Key Points 878

Chapter 41

Valuation of Agency Mortgage-Backed Securities 881

Frank J. Fabozzi, Scott F. Richard, and Peter Ru

- Static Valuation 882
- Dynamic Valuation Modeling 883
- Illustrations 891
- Key Points 898

Chapter 42

Convertible Securities: Their Structures, Valuation, and Trading 899

Mihir Bhattacharya

- Evolution in the Convertible Markets 903
- Basic Characteristics of Convertible Securities 920
- Approaches to Valuation of Convertibles 925
- Exercising the Embedded Options 939
- Looking Forward 942
- Key Points 944

PART SIX

CREDIT RISK

Chapter 43

Credit Analysis for Corporate Bonds 949

Martin Fridson, Frank J. Fabozzi, and Adam B. Cohen

- Approaches to Credit Analysis 949
- Industry Considerations 952

Financial Analysis	958
Combining Financial and Nonfinancial Analysis	968
Indenture Provisions	970
Utilities	976
Finance Companies	981
The Analysis of High-Yield Corporate Bonds	986
Credit Scoring Models	992
Key Points	994

Chapter 44

The Credit Analysis of Municipal General Obligation and Revenue Bonds 995

Sylvan G. Feldstein, Alexander Grant, and David Ratner

The Legal Opinion	996
The Need to Know Who Really Is the Issuer	1001
On the Financial Advisor and Underwriter	1003
General Credit Indicators and Economic Factors in the Credit Analysis	1004
Red Flags for the Investor	1020
Information Sources for the Analyst	1021
Key Points	1022

Chapter 45

Credit-Risk Modeling 1025

Tim Backshall, Kay Giesecke, and Lisa Goldberg

Structural Credit Models	1026
Reduced-Form Credit Models	1036
Incomplete-Information Credit Models	1040
Key Points	1044

PART SEVEN

MULTIFACTOR RISK MODELS

Chapter 46

Introduction to Multifactor Risk Models in Fixed Income and Their Applications 1049

Anthony Lazarus, António Baldaque da Silva, Radu Găbudean, and Arne D. Staal

Motivation and Structure Underlying Fixed Income Multifactor Risk Models	1050
Fixed Income Risk Models	1052
Applications of Risk Modeling	1058
Key Points	1066

Chapter 47

Analyzing Risk from Multifactor Fixed Income Models 1069

Anthony Lazanas, António Baldaque da Silva, Radu C. Găbudean, and Arne D. Staal

Approaches Used to Analyze Risk 1070

Key Points 1099

Chapter 48

Hedging Interest-Rate Risk with Term-Structure Factor Models 1101

Lionel Martellini, Philippe Priaulet, and Frank J. Fabozzi

Defining Interest-Rate Risk(s) 1102

Hedging with Duration 1103

Relaxing the Assumption of a Small Shift 1106

Relaxing the Assumption of a Parallel Shift 1108

Comparative Analysis of Various Hedging Techniques 1114

Key Points 1118

PART EIGHT

BOND PORTFOLIO MANAGEMENT

Chapter 49

Introduction to Bond Portfolio Management 1123

Kenneth E. Volpert

Overview of Traditional Bond Management 1123

Overview of the Core/Satellite Approach 1126

Why Choose Indexing? 1127

Which Index Should Be Used? 1130

Primary Bond Indexing Risk Factors 1133

Enhancing Bond Indexing 1138

Measuring Success 1145

Key Points 1149

Chapter 50

Quantitative Management of Benchmarked Portfolios 1151

Lev Dynkin, Jay Hyman, Vadim Konstantinovskiy, and Bruce D. Phelps

Selection and Customization of Benchmarks 1152

Diversification Issues in Benchmarks 1157

Portfolio Analysis Relative to a Benchmark 1162

Quantitative Approaches to Benchmark Replication 1168

Replication with Cash Instruments: Stratified Sampling 1169

Controlling Issuer-Specific Risk in the Portfolio 1174

Quantitative Methods for Portfolio Optimization 1178

Tools for Quantitative Portfolio Management 1180
Key Points 1181

Chapter 51

Global Credit Bond Portfolio Management 1183

Jack Malvey

Credit Relative-Value Analysis 1186
Total-Return Analysis 1191
Primary Market Analysis 1191
Liquidity and Trading Analysis 1193
Secondary Trade Rationales 1194
Spread Analysis 1200
Structural Analysis 1204
Credit-Curve Analysis 1208
Credit Analysis 1209
Asset Allocation/Sector Rotation 1210
Key Points 1211

Chapter 52

Elements of Managing a High-Yield Bond Portfolio 1213

Mark R. Shenkman and Nicholas R. Sarchese

Bottom-Up–Credit/Security Analysis 1214
Top-Down High-Yield Market Drivers and Macro Considerations 1235
Portfolio Considerations 1239
Key Points 1246

Chapter 53

International Bond Portfolio Management 1247

Karthik Ramanathan, James M. Gerard, and Frank J. Fabozzi

Overview of International Bond Market Investing 1248
Investment Objectives and Policy Statements 1249
Developing a Portfolio Strategy 1255
Sources of Excess Return 1257
The Fundamental-Based Investment Approach 1260
Portfolio Construction 1263
Key Points 1275

Chapter 54

Fixed Income Transition Management 1277

Ananth Madhavan and Daniel Gallegos

Basics of Fixed Income Transitions 1278
Transition Metrics and Objectives 1281

Case Study of Risk Management 1288

Key Points 1289

Chapter 55

Managing the Spread Risk of Credit Portfolios Using the Duration Times Spread Measure 1291

Arik Ben Dor, Lev Dynkin, and Jay Hyman

The Need for a New Measure of Credit Spread Exposure 1292

Spread Volatility and DTS 1295

Risk Projection: Predicting Spread Volatility 1298

Hedging: Predicting Sensitivities to Market Spread Changes 1302

Replication: Creating Index Tracking Portfolios 1306

Expressing Macro Views in Active Portfolios 1310

Portfolio Construction: Optimal Diversification of Issuer Risk 1311

Modeling: Calibrating Credit-Risk Factors 1314

Key Points 1316

Chapter 56

Investing in Distressed Structured Credit Securities 1319

Alfred Murata

Background 1319

Economic (Credit) Risk versus Financial (Leverage) Risk 1321

Analysis of Nonagency Mortgage-Backed Securities 1322

Key Points 1330

Chapter 57

Hedge Fund Fixed Income Strategies 1331

Ellen Rachlin, Chris P. Dialynas, and Vineer Bhansali

Macro Investing 1332

Asset-Backed Credit Strategy 1342

Capital Structure Arbitrage 1344

Long/Short Credit Strategy 1345

Distressed 1347

Basis Trading 1348

Index Arbitrage and Correlation Trading 1350

Volatility Trading 1351

Key Points 1352

Chapter 58

Financing Positions in the Bond Market 1355

Frank J. Fabozzi and Steven V. Mann

Repurchase Agreement 1355

Dollar Rolls 1359

Margin Buying 1362

Securities Lending 1363

Key Points 1365

PART NINE

DERIVATIVES

Chapter 59

Introduction to Interest-Rate Futures and Options Contracts 1369

Frank J. Fabozzi, Steven V. Mann, Mark Pitts, and Robin Grieves

Basic Characteristics of Derivative Contracts 1370

Representative Exchange-Traded Interest-Rate Futures Contracts 1373

Mechanics of Futures Trading 1380

Representative Exchange-Traded Futures Options Contracts 1383

OTC Contracts 1387

Key Points 1393

Chapter 60

Pricing Futures and Portfolio Applications 1395

Frank J. Fabozzi, Mark Pitts, and Bruce M. Collins

Pricing of Futures Contracts 1395

Applications to Portfolio Management 1403

Portable Alpha 1406

Key Points 1408

Chapter 61

Controlling Interest-Rate Risk with Futures and Options 1409

Frank J. Fabozzi, Shrikant Ramamurthy, and Mark Pitts

Controlling Interest-Rate Risk with Futures 1409

Hedging with Options 1428

Key Points 1442

Chapter 62

Interest-Rate Swaps and Swaptions 1445

Frank J. Fabozzi, Steven V. Mann, and Moorad Choudhry

- Description of an Interest-Rate Swap 1445
- Interpreting a Swap Position 1447
- Terminology, Conventions, and Market Quotes 1449
- Valuing Interest-Rate Swaps 1451
- Primary Determinants of Swap Spreads 1468
- Nongeneric Interest-Rate Swaps 1470
- Canceling a Swap 1474
- Credit Risk 1474
- Swaptions 1475
- Key Points 1478

Chapter 63

The Valuation of Interest-Rate Swaps and Swaptions 1479

Gerald W. Buetow and Brian J. Henderson

- Swap Valuation Using the Lattice Approach 1480
- Forward-Start Swaps 1486
- Valuing Swaptions 1490
- Valuing Basis Swaps and Non-LIBOR-Based Swaps 1495
- Factors Affecting Swap Valuation 1498
- Key Points 1500

Chapter 64

The Basics of Interest-Rate Options 1501

William J. Gartland and Nicholas C. Letica

- How Options Work 1501
- Options Strategies—Reorganizing the Profit/Loss Graph 1514
- Classic Option Strategies 1515
- Practical Portfolio Strategies 1518
- Volatility 1521
- Key Points 1523

Chapter 65

Interest-Rate Caps and Floors 1525

George L. Albota and Radu S. Tunaru

- Caps and Floors Defined 1525
- Collars and Corridors 1526

Hybrid Type Instruments	1527
Potential Applications of Caps and Floors	1528
Caplets and Floorlets	1528
Insights on Trading Caps and Floors	1530
Caps and Floors versus Swaptions Wedge	1535
Key Points	1538

Chapter 66

Credit Derivatives 1541

Dominic O'Kane

Evolution of the Credit Derivatives Market	1541
The Credit Default Swap	1546
CDS Mechanics	1547
Credit Events	1551
The CDS Settlement Timeline	1554
CDS Indices	1562
Importance of the CDS Market	1565
Key Points	1566

Chapter 67

Credit Derivative Valuation and Risk 1569

Dominic O'Kane

CDS Valuation	1569
The CDS–Bond Relationship	1571
Model	1576
New and Existing Contracts	1582
Risk Management	1583
CDS Index Valuation	1589
Key Points	1592

Chapter 68

Hedging Tail Risk 1593

Stephen J. Antczak

Step-by-Step Guide to Hedging	1595
The Need to Hedge	1596
Overview of Select Tail Risks	1600
Generic Challenges Facing Hedgers	1605
Unfunded Hedges (Insurance)	1613
Funded Hedges (Alpha Trades)	1618
Key Points	1631

PART TEN

PERFORMANCE EVALUATION AND RETURN ATTRIBUTION ANALYSIS

Chapter 69

Principles of Performance Attribution 1635

Anthony Lazanas, António Baldaque da Silva, Chris Sturhahn, Eric P. Wilson, and Pam Zhong

Principles of Performance Attribution	1636
Mathematics of Performance Attribution	1639
Applications of Performance Attribution	1647
Key Points	1670

Chapter 70

Performance Attribution for Portfolios of Fixed Income Securities 1671

Anthony Lazanas, António Baldaque da Silva, Chris Sturhahn, Eric P. Wilson, and Pam Zhong

Return Splitting	1672
Outperformance Breakdown	1681
Total Return Model	1682
Excess Return Model	1688
Fully Analytical Model	1697
Selecting an Appropriate Attribution Model	1709
Key Points	1710

Chapter 71

Advanced Topics in Performance Attribution 1711

Anthony Lazanas, António Baldaque da Silva, Chris Sturhahn, Eric P. Wilson, and Pam Zhong

Multicurrency Attribution	1712
Derivatives and Leverage	1728
From Theory to Practice	1735
Key Points	1739

APPENDIX

Methodology for Calculating Currency Exposures in Bond Portfolios and Indexes 1741

Curt Hollingsworth

Main Formula for Bond Portfolios	1742
Main Formula for Citigroup Indexes	1753
Main Formula for Barclays Capital Indices	1757

Index 1763