

CAPITAL MARKETS

FIXED INCOME ANALYSIS

PROGRAMME DATES	PROGRAMME DURATION	MODE OF DELIVERY	PROGRAMME FEE
SELF-PACED	13 Hours25 Min	ONLINE LEARNING	RM2,400.00 NETT

LEARNING OVERVIEW

Most global capital market instruments are some forms of tradable debt security (“bond”). The term “fixed income” is often used to refer to the whole bond market since the vast majority of these securities (although not all) have regular, fixed, interest payments (“coupons”). Bond valuation requires methods of calculating and comparing the current values of multiple potential future cash flows. This tutorial introduces the basic concept of the inverse price/yield relationship and explains how prices and yields are calculated for simple “bullet” bonds.

LEARNING OUTCOME

On completion of this module, you should be able to:

- Explain The Significance of The Inverse Relationship Between Bond Prices and Yields
- Differentiate Types of Yield Curve and The Key Theories That Seek to Explain How Term Structures Arise
- Determine The Key Features of Zero-Coupon Securities
- Evaluate The Duration and Convexity Analysis in Measuring Bond Price Sensitivity
- Explain The Key Features of Floating Rate Notes (FRNs)

Table of Contents

FIXED INCOME ANALYSIS – An Introduction	2
BOND PRICES & YIELDS – Excel Interactive.....	2
YIELD CURVES – An Introduction.....	4
YIELD CURVES – Construction.....	5
YIELD CURVES – Excel Interactive.....	6
ZERO-COUPON SECURITIES	6
DURATION ANALYSIS – An Introduction	7
CONVEXITY ANALYSIS.....	8
FIXED INCOME ANALYSIS – Credit Risk	9
HIGH YIELD DEBT	10
FLOATING RATE NOTES - FRNs	11
FRN STRUCTURES	12
OPTION-LINKED SECURITIES	13
INFLATION-LINKED SECURITIES	14
FIXED INCOME DERIVATIVES	15

TOPICS DETAILS CONTENTS

FIXED INCOME ANALYSIS – An Introduction

OVERVIEW

Most global capital market instruments are some forms of tradable debt security (“bond”). The term “fixed income” is often used to refer to the whole bond market since the vast majority of these securities (although not all) have regular, fixed, interest payments (“coupons”). Bond valuation requires methods of calculating and comparing the current values of multiple potential future cash flows

PRE-REQUISITE KNOWLEDGE	Bond Market
PROGRAMME LEVEL	Introductory
DURATION	60 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recognize the importance of fixed income analysis, and the significance of the inverse price/yield relationship
- Calculate the yields for bullet bonds
- Identify how coupon frequencies and day count fractions affect the various calculations

THE CONTENTS

TOPIC 1 ♦ BOND PRICE & YIELDS

- Attributes of a Bond
- Par Value of a Bond
- Current Value of a Bond
- Bullet Bonds
- Relationship Between Price & Yield
- Yield to Maturity
- Multi-Annual Payments
- Calculating the Yield
- Pull to Par
- Current Yield
- Simple Yield
- Current Yield vs. Simple Yield

TOPIC 2 ♦ EFFECTIVE & NOMINAL RATES

- Compounding Frequency
- Comparing Different Compounding Rate

TOPIC 3 ♦ VALUATION BETWEEN COUPON DATES

- Intra-Coupon Period Settlements
- Accrued Interest
- Dirty Price vs. Clean Price
- Day Count Convention

TOPIC 4 ♦ SHORTCOMINGS IN YIELD AS A RETURN MEASUREMENT

- Problems with YTM
- YTM as a Summary Statistic
- YTM Nonvanilla Bonds

BOND PRICES & YIELDS – Excel Interactive

OVERVIEW

Microsoft Excel has several functions simplifying bond price/yield calculations. These range from simple time value of money (TVM) functions through to more complicated calculations that value bonds between coupon periods. This tutorial demonstrates how to use Excel to calculate a bond's price/yield, both on a coupon date and between coupon dates. It also outlines how the process can be made easier using some of Excel's built-in functions.

PRE-REQUISITE KNOWLEDGE	Fixed Income Analysis
PROGRAMME LEVEL	Intermediate
DURATION	20 Minutes

YIELD CURVES – An Introduction

OVERVIEW

A yield curve (or term structure) compares bond yields with their maturities – yields move upward and downward as maturities increase. However, the heterogeneous nature of various interest rate sensitive instruments complicates simple comparisons. Differing yield curves are used to describe differing instruments. This tutorial covers the major forms of yield curve and outlines the key theories that seek to explain how term structures arise.

PRE-REQUISITE KNOWLEDGE	Yield Curves
PROGRAMME LEVEL	Intermediate
DURATION	75 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recognize how a yield curve shows the term structure of interest rates
- Identify how short rate quotations compare with longer dated ones
- List the different yield curve shapes and variants
- Identify the difference between spot, par, and forward yield curves
- Recognize the major theories underlying interest rate term structures

THE CONTENTS

TOPIC 1 ♦ OVERVIEW OF YIELD CURVES

- Definition of a Yield Curve
- Attraction of Yield Curves
- Comparing Bonds
- Benchmark Bonds
- Other Benchmarks
- Consistency in Benchmarks

TOPIC 2 ♦ COMPARING SHORT & LONGER-DATED QUOTATIONS

- Days Basis
- Bond Equivalent Yield (BEY)
- Discount Yield
- Discount Yield & Bond Equivalent Yield Example

TOPIC 3 ♦ TYPES OF YIELD CURVE

- Shape of the Yield Curve
- Yield Curve Variants
- Zero-Coupon (Spot) Yield Curve
- Constructing the Zero-Coupon (Spot) Yield Curve Using Bootstrapping
- Discount Factors
- Calculating Discount Factors
- Discounting Cash Flows
- Par-Coupon Yield Curve
- Constructing a Par-Coupon Yield Curve Using Bootstrapping
- Zero Coupon Curve vs. Par Coupon Curve

TOPIC 4 ♦ YIELD CURVES & FORWARD RATES

- Implied Forward Rates
- Forward Curve
- Zero Coupon Curve vs. Par Coupon Curve vs. Forward Coupon Curve

TOPIC 5 ♦ THEORIES UNDERLYING INTEREST RATE TERM STRUCTURES

- The Major Theories Underlying Interest Rate Term Structures
- Yield Curve Theories
- Pure Expectations
- Liquidity Preference/Bond Risk Premium (BRP)
- Market Segmentation/Preferred Habit

YIELD CURVES – Construction

OVERVIEW

This section looks at how we generate theoretical spot curves from the observable prices of market instruments. We outline the problems associated with rate interpolation and describe some of the solutions. Finally, we show how Z-spread calculations can use spot curves to assess value.

PRE-REQUISITE KNOWLEDGE	Yield Curves
PROGRAMME LEVEL	Advanced
DURATION	75 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recognize the importance of accurate yield curves in the pricing and valuation of fixed income and derivative instruments
- Identify the key stages involved in yield curve construction
- Determine simple spot and forward yield curves using the bootstrapping methodology
- Recognize the challenges involved in calculating interpolated values
- Calculate a Z-spread by discounting bond cash flows using a spot curve

THE CONTENTS

TOPIC 1 ♦ OVERVIEW OF YIELD CURVES

- Spot Curves
- Attributes of a Good Yield Curve

TOPIC 2 ♦ CONSTRUCTING THE YIELD CURVE

- Two-Stage Construction Process
- Discount Factors
- Discount Factors & Different Compounding Frequencies
- Instruments Used for Calculating DFs
- Calculating DFs Example
- Constructing the Yield Curve Using Futures Contracts
- Constructing the Yield Curve Using the Strip Mode

TOPIC 3 ♦ CONVEXITY

- Convexity Bias
- Convexity Arbitrage
- OIS Discounting

TOPIC 4 ♦ METHODS OF INTERPOLATION

- Piecewise Models Linear Interpolation
- Piecewise Models Splines
- Parametric Models Best-Fit
- Combining Bootstrapping with Interpolation

TOPIC 5 ♦ Z-SPREADS

- Z-Spreads Overview
- Z-Spreads Example

YIELD CURVES – Excel Interactive

OVERVIEW

Microsoft Excel provides a way to extrapolate yield curves from the quoted rates of financial instruments. This tutorial demonstrates how to use Excel to calculate the zero (spot) rates for a coupon-paying bond and how to determine both short-dated and long-dated discount factors given the zero (spot) rates.

PRE-REQUISITE KNOWLEDGE	Yield Curves
PROGRAMME LEVEL	Advanced
DURATION	30 Minutes

ZERO-COUPON SECURITIES

OVERVIEW

Zero-coupon bonds are securities that are issued at a deep discount to par and pay no interim interest before maturity. This tutorial looks at the key features of these instruments, how they are priced and traded, the main issuers and investors in these instruments, and their key variants.

PRE-REQUISITE KNOWLEDGE	Yield Curves
PROGRAMME LEVEL	Intermediate
DURATION	45 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recognize the key features of zero-coupon bonds and how they are priced
- Identify the different issuers and investors in zero-coupon bonds and the benefits and risks they face with these securities
- List the key variants of zero-coupon bonds

THE CONTENTS

TOPIC 1 ♦ OVERVIEW OF ZERO-COUPON SECURITIES

- What Is a Zero-Coupon Bond?
- Decomposing Coupon Bonds into Zeros
- Decomposing Coupon Bonds into Zeros Example
- Pricing a Zero-Coupon Bond
- Benefits of Zero-Coupon Bonds for Issuers & Investors

TOPIC 2 ♦ RISKS OF ZERO-COUPON SECURITIES

- Interest Rate Risk
- Credit Risk
- Scenario Investing in Zero-Coupon Bonds

TOPIC 3 ♦ ZERO-COUPON BOND ISSUERS & STRUCTURES

- Zero-Coupon Government Bonds
- Zero-Coupon Government Bonds US Market
- Zero-Coupon Government Bonds Non-US Markets
- Corporate & Municipal Zero-Coupon Bonds
- Corporate & Municipal Zero-Coupon Bonds Structures

DURATION ANALYSIS – An Introduction

OVERVIEW

Duration is a measure of the sensitivity of bond prices to changes in yield. This tutorial looks at the key types of duration figure, including Macaulay duration, modified duration, money duration, and spread duration. It also examines the use of duration in hedging and immunizing fixed income portfolios as well as looking at rate sensitivity measures for other types of fixed rate instrument such as floating rate notes, swaps, inflation-linked bonds.

PRE-REQUISITE KNOWLEDGE	Bond Market
PROGRAMME LEVEL	Intermediate
DURATION	75 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recall how bond prices are sensitive to movements in yield
- Calculate the Macaulay duration and modified duration on a bond
- Identify adjustments to duration numbers to account for convexity
- Recognize how duration can be used to hedge and immunize a single bond or bond portfolio
- Identify rate sensitivity numbers for other types of fixed income instrument such as floating rate notes, swaps, and inflation-linked securities.

THE CONTENTS

TOPIC 1 ♦ BOND INTEREST RATE SENSITIVITY

- Bond Interest Rate Sensitivity
- The Sensitivity of Bond Prices

TOPIC 2 ♦ MACAULAY DURATION

- Macaulay Duration
- What Is Macaulay Duration?
- Macaulay Duration Balancing Point
- Calculating Macaulay Duration Between Coupon Dates
- Macaulay Duration Formula
- Factors Affecting Macaulay Duration

TOPIC 3 ♦ MODIFIED DURATION

- Modified Duration
- What Is Modified Duration?
- Money Duration (Risk)
- Convexity & Approximate Duration
- Duration of a Portfolio
- Curve Duration
- Curve Duration Options
- Key Rate Duration (KRD)

TOPIC 4 ♦ DURATION HEDGING & IMMUNIZATION

- Duration Hedging & Immunization
- Duration-Based Hedging
- Duration-Based Hedging
- Duration-Based Hedging Issues
- Immunization
- Immunization of a Bond Portfolio

TOPIC 5 ♦ OTHER SENSITIVITIES

- Other Sensitivities
- Floating Rate Notes (FRNs)
- FRN Rate Sensitivity
- Interest Rate Swap (IRS)
- Spread Duration
- Inflation-Linked Bonds (ILBs)

CONVEXITY ANALYSIS

OVERVIEW

Convexity helps to approximate the change in the price of a bond that is not explained by duration. This tutorial shows how convexity is calculated for a single security or a fixed income portfolio. The different types of portfolios, such as positive and negative duration, approximate portfolio, and effective duration are also discussed in detail.

PRE-REQUISITE KNOWLEDGE	Duration Analysis
PROGRAMME LEVEL	Intermediate
DURATION	50 Minutes

OBJECTIVES

On completion of this tutorial, you should be able to:

- Recognize the importance of convexity in approximating the change in bond price that isn't explained by duration
- Identify the different types of convexity
- Calculate the convexity number for a fixed income portfolio

THE CONTENTS

TOPIC 1 ♦ OVERVIEW OF CONVEXITY

- What Is Convexity?
- Duration & Taylor Series
- Convexity Formula
- Scenario: Convexity of a Bond
- Factors Influencing Convexity

TOPIC 2 ♦ TYPES OF CONVEXITY

- Positive Convexity
- Negative Convexity
- Approximate Convexity
- Effective Convexity
- Spread Convexity

TOPIC 3 ♦ PORTFOLIO CONVEXITY

- Overview of Portfolio Convexity
- Mixing Convexity & Duration: Example
- Bullets & Barbells
- Bullets & Barbells (cont'd)
- Beyond Convexity

FIXED INCOME ANALYSIS – Credit Risk

OVERVIEW

Credit risk is a key concern for bondholders. This tutorial looks at how credit risk is reflected in market spreads and how rating agencies assess this risk. The evolution of credit risk into a distinct asset class is also examined

PRE-REQUISITE KNOWLEDGE	Fixed Income Analysis
PROGRAMME LEVEL	Intermediate
DURATION	60 Minutes

OBJECTIVES

On completion of this tutorial, you will be able to:

- Identify how bondholders are exposed to credit risk
- Recognize how credit spreads are embedded in market prices
- Recall how ratings agencies assess the credit risk of fixed income securities
- Recognize how credit has evolved into a distinct asset class

THE CONTENTS

TOPIC 1: CREDIT RISK IN FIXED INCOME

- Bonds & Credit Risk
- Credit Spreads
- Expected Loss
- Implied Versus Real-World Measures
- Credit Models
- Bond Documentation & Credit Risk

TOPIC 2: CREDIT RATINGS

- Overview of Credit Ratings
- Ratings Tables
- Credit Ratings Issues
- Rating Methodologies
- Rating Changes
- Credit Rating Agencies: Controversies
- Credit Rating Agencies: Regulation

TOPIC 3: CREDIT AS AN ASSET CLASS

- The Importance of Credit
- Isolating Credit: Credit Default Swaps
- Credit Default Swaps: Issues

HIGH YIELD DEBT

OVERVIEW

High yield debt refers to securities and loans rated below the investment grade thresholds laid down by the major credit rating agencies. High yield debt compensates investors for the additional credit risk by generating additional returns. This tutorial looks at the ratings attached to high yield debt, the key structures used, and the primary and secondary markets for these assets.

PREREQUISITE KNOWLEDGE	Bond Markets
PROGRAMME LEVEL	Intermediate
DURATION	60 mins

OBJECTIVES

On completion of this tutorial, you will be able to:

- Recognize how high yield debt is graded by the main ratings agencies and recall how the market for high yield assets developed
- Identify the key structures and features of high yield debt
- List the key participants in the primary and second markets for high yield debt

THE OUTLINE

TOPIC 1 ♦ FEATURES OF HIGH YIELD DEBT

- Overview of High Yield Debt
- Attractions & Risks of High Yield Debt for Investors
- Credit Ratings for High Yield Debt
- Development of the High Yield Market

TOPIC 2 ♦ HIGH YIELD DEBT STRUCTURES

- Overview of High Yield Bond Types
- Floating Rate Notes (FRNs)
- Low Coupon Structures
- Equity-Linked Bonds
- Leveraged Loans
- High Yield Funds
- Call Provisions
- Credit Protection

TOPIC 3 ♦ MARKETS & MARKET PLAYERS

- Issuers
 - Fallen Angels & Rising Stars
 - Crossover Bonds
- Investors
 - Primary Market
 - Secondary Market
 - High Yield Bond Indexes
- High Yield Investing
 - Spreads
 - High Yield Bonds as a Separate Asset Class

FLOATING RATE NOTES - FRNs

OVERVIEW

An FRN is a debt security that pays a coupon linked to a benchmark index, such as LIBOR. This tutorial looks at the key features of FRNs, examines how FRN coupons are determined, discusses the price sensitivity of FRNs as expressed by effective duration and shows how the discount margin on FRNs is calculated in Excel.

PRE-REQUISITE KNOWLEDGE	Fixed Income Analysis
PROGRAMME LEVEL	Intermediate
DURATION	45 Minutes

OBJECTIVES

On completion of this module, you will be able to:

- Identify the key features of FRNs
- Recognize how an FRN coupon is calculated using a benchmark index and reset margin
- Recall how the effective duration for FRNs is typically close to zero
- Calculate the discount margin on an FRN using Excel

THE OUTLINE

TOPIC 1 ♦ FEATURES OF FRNS

- What Is an FRN?
- Benchmark Indices
- FRN: Selected Issue Terms
- Scenario: FRN Coupon Payments

TOPIC 2 ♦ DYNAMICS OF FRNS

- Effective Duration
- Effective Duration: No Coupons Set
- Situations Giving Rise to Positive Effective Duration
- Effective Duration: Examples
- FRN Coupons & Reset Spreads
- Discount Margin (Effective Spread)
- Discount Margin Calculation
- Pricing an FRN

FRN STRUCTURES

OVERVIEW

An FRN is an instrument frequently seen in the structure product space. This tutorial looks at the key features of FRNs and the different variants of these instruments.

PRE-REQUISITE KNOWLEDGE	Option
PROGRAMME LEVEL	Intermediate
DURATION	45 Minutes

OBJECTIVES

On completion of this module, you will be able to:

- Identify the key features of an FRN, including floating coupons, benchmark indices, reset dates, caps and floors, duration, and interest rate sensitivity.
- Recognize the key variants of FRN seen with structured products, including constant maturity based FRNs, callable FRNs, inverse FRNs, and collateralized mortgage obligation (CMO) products.

THE OUTLINE

TOPIC 1 ♦ OVERVIEW OF FRNS

- What Is an FRN?
- FRNs & Margins
- Caps & Floors
- FRN Sensitivity in the Presence of Caps & Floors
- FRN Sensitivity in the Presence of Caps & Floors: Example
- FRNs & Effective Duration

TOPIC 2 ♦ CONSTANT MATURITY-BASED FRNS

- What are CMS-Based FRNs?
- CMS-Based FRNs: Risks
- Constant Maturity Treasury (CMT) Rates & Spreads

TOPIC 3 ♦ CALLABLE FRNS

- What Is a Callable FRN?
- Step-Up-And-Call Notes: Credit Implications

TOPIC 4 ♦ INVERSE FRNS

- What Is an Inverse FRN?
- Scenario: Inverse FRN

TOPIC 5 ♦ COLLATERALIZED MORTGAGE OBLIGATION (CMO) FRNS

- CMO FRNs

OPTION-LINKED SECURITIES

OVERVIEW

Although most bonds are simple debt securities with fixed or variable coupons, there are many option-related bonds. Although some have detachable warrants (options on specific securities), most have embedded options where option exercise affects the characteristics of the bond.

PRE-REQUISITE KNOWLEDGE	Fixed Income Analysis
PROGRAMME LEVEL	Intermediate
DURATION	60 Minutes

OBJECTIVES

On completion of this module, you will be able to:

- Identify the different issuer and investor options and their associated costs and benefits
- Recognize the problems valuing embedded option and illustrate how a binomial-tree may be used to price them

THE OUTLINE

TOPIC 1 ♦ BASICS OF EMBEDDED OPTIONS

- Definition of Embedded Options
- Calls & puts and the Benefits and Drawbacks
- Prepayments
- Capped & Floored FRNs
- Convertibles
- Complex Options
- Implicit & Explicit Options

TOPIC 2 ♦ VALUATION OF OPTION-LINKED SECURITIES

- What Can (& Cannot) Be Valued
- Make Whole Call: Example
- Bond Yields
- Problems Valuing Embedded Options
- Black-Derman-Toy Model: Binomial Framework
- Binomial Framework: Pricing an Option-Linked Security
- Putable Bonds
- Option Valuation
- Binomial Trees & Variable Volatility
- Option Adjusted Spread (OAS)
- Option Adjusted Spread (OAS): Example
- Where Does Volatility Come From?
- Extending the Model to Other Bonds
- Different Models
- Industrial Strength Models

INFLATION-LINKED SECURITIES

OVERVIEW

Inflation-linked securities (ILS) are securities that pay a fixed coupon plus an amount tied to an inflation index, thus, protecting the investor's return against inflation. This tutorial looks at how inflation arises, how investors can manage inflation risk using inflation-linked securities, and the structures used with these instruments.

PRE-REQUISITE KNOWLEDGE	Bond Market
PROGRAMME LEVEL	Intermediate
DURATION	45 Minutes

OBJECTIVES

On completion of this module, you will be able to:

- Recognize the phenomenon inflation in modern economies
- Recall how inflation-linked securities can help investors manage inflation risk
- Identify the key structures used with inflation-linked securities

THE OUTLINE

TOPIC 1 ♦ INFLATION

- Overview of Inflation
- Inflation Indices
- Impact of Inflation on Securities

TOPIC 2 ♦ INFLATION-LINKED SECURITIES

- What Are Inflation-Linked Securities?
- The Fisher Equation
- Nominal & Real Yields: Example
- Breakeven Inflation Rate
- Inflation-Linked Securities: Speculation
- Scenario
- Issuers & Investors

TOPIC 3 ♦ INFLATION-LINKED STRUCTURES

- Inflation-Linked Security Structures
- UK, US, Canada
- Canadian Method: Steps
- Australia
- Dirty Prices & Accrued Interest
- Deflation Floors

FIXED INCOME DERIVATIVES

OVERVIEW

Derivative products add flexibility to investor portfolios by allowing risks to be offset, increased, or transformed. This tutorial describes the most important fixed income derivatives, and shows how, even for non-derivative fixed income products, derivative analysis illuminates valuations, sensitivity analyses, and product comparisons.

PRE-REQUISITE KNOWLEDGE	Fixed Income Analysis
PROGRAMME LEVEL	Intermediate
DURATION	60 Minutes

OBJECTIVES

On completion of this module, you will be able to:

- Identify the key types of fixed income derivative
- Recognize how fixed income derivatives allow agents to transform risks
- Recognize how no-arbitrage concepts are used in fixed income analysis

THE OUTLINE

TOPIC 1 ♦ BOND DERIVATIVES

- Bond Derivatives
- Bond Options & Forwards

TOPIC 2 ♦ INTEREST RATE DERIVATIVES

- Forward Rate Agreement (FRAs)
- Short-Term Interest Rate (STIR) Futures
- Interest Rate Swaps
- Basis Swaps
- Interest Rate Options
- Credit Derivatives
- Inflation Derivatives

TOPIC 3 ♦ UNBUNDLING RISK

- Transformations
- Scenario
- Embedded Options
- Unbundling: Example

TOPIC 4 ♦ DERIVATIVES & FIXED INCOME ANALYSIS

- Comparing Instruments
- Arbitrage & Replication Strategies
- Limitations of Arbitrage
- Putting It Together: Valuations
- Options & Sensitivities