Geometric Progression

Creative Disruption

Interest Rate Markets Boot Camp

Overview

This course is intended for practitioners in the financial markets who want to gain a complete understanding of money markets & bonds and the way to trade and price these products.

Delegates will be able to describe the different fixed income instruments; price these products; manage and measure the interest rate risk using a variety of instruments and derive yield curves.

Please note that laptops are encouraged but are not compulsory - delegates who don't bring their own laptops will be able to follow along quite easily as all spreadsheets and data are provided. Some of the key details that are discussed are:

- Decomposing yield to maturity into its components and credit spreads.
- Traditional bond valuation incorporating broken periods versus the annuity formula.
- Full explanation of the Bond Pricing Formula as per the BESA \ JSE specification.
- International Comparisons of bond formulas for different countries and Accrued interest conventions e.g. 30(E)/360, Act/365 L, Act/ Act, ISMA method etc.
- Implications of the South African Bond pricing formula.
- Understanding approximations and deriving Macaulay's duration, modified duration, delta & convexity from first principles (with reference to the JSE specification.)
- Pricing inflation linked bonds in Excel.
- Trading on yield and Clean Price.
- Types of bonds.
- Types of Money market instruments.
- Yield curves, bootstrapping and interpolation.
- Pricing FRNs.
- Pricing vanilla Repos and inflation linked Repos.
- Spread trading
- A look at bond portfolios incorporating bullets, barbells and ladders etc.

Please refer to the detailed agenda in the pages below for more info.

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Level: Intermediate to Advanced.

Duration:
5 Days.

Prerequisites

This course assumes you have a basic understanding of financial markets already (e.g. The Understanding the Financial Markets Course).

Furthermore this course assumes you understand:

- The basics of the time value of money (FV, PV) etc. **We can extend the course for half a day and incorporate time value of money, Fv, Pv, compounding, annuities, NACS (and variations thereof), the money market basis versus the bond basis, continuous compounding etc with Excel**.
- Some sections of the course use elementary calculus and linear algebra. Knowledge of these concepts is useful but not compulsory.
- The basics of how to use Excel.

Some of the above pre-requisites will be made available in the form of pdf notes or Elearning before the course for those that are a bit rusty on these topics or want some pre-course reading.

Suitable for

- Business analysts;
- Valuations staff and accountants;
- Investment analysts and Research;
- Investors & Traders;
- Regulators & Compliance Staff;
- Risk Managers;
- Fund Managers & Trustees;
- Graduates and interns;
- Delegates registered to write CFA® exam, FRM® exam, PRM®exam;
- Anyone seeking a greater insight into the Bond Market;

A certificate is available on request

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Some of the Clients who have attended our Public Courses

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Agenda

1. The fundamentals of the interest rate markets

- Brief overview of funding through Debt vs Equity;
- Features and characteristics of interest rate markets;
- Jargon of the Money Market and Bond Market;
- Primary Bond Issuance and Road Shows;
- Coupons and coupon setting;
- Sinking Provisions;
- Subordination & Covenants etc;
- Rating Agencies;
- Understanding Yield to maturity;
- Discount versus Yield;
- Credit spreads and real yield.

This section will include a general Question and answer discussion session.

2. The fundamentals of pricing Money Market Instruments & Bonds.

Delegates who have registered for the course will receive documents and video regarding the time value of money in detail. This allows Mark to simply recap the topics as it applies to pricing. This is done to give delegates a chance to familiarise themselves with the jargon and to save extensive time on a topic which is incorporated in many University (and other) qualifications. **Note, we can go through these topics from scratch such as the Time Value of Money, Fv, Pv, compounding, annuities, NACS (and variations thereof), the money market basis versus the bond basis, continuous compounding etc with Excel**. If so, please add half a day.

- Pricing NCDs and Bills.
- Broken Periods;
- Books Closed Dates, Cum Interest and Ex-Interest;
- All in Price, Clean Price, Accrued Interest;
- The Accrued Interest Anomaly;
- **What makes South Africa bond Pricing different!**
- Pricing Bonds.
- International comparisons of bond formulas for different countries and Accrued interest conventions e.g. 30(E)/360, Act/365 L, Act/ Act, ISMA method etc.

Delegates are welcome to bring their own laptops for this exercise. Please note that laptops are not compulsory but recommended.

3. Implications of the South African Bond Pricing Formulae.

- "The saw tooth effect".
- Pull to Par.
- Anomalies of the SA Bond Pricing formula.
- The problem of Accrued Interest.
- YTM vs Spot rates.
- Calculating Bond Returns and a look at historical bond returns.

4. Trading in Bonds

- The Trading environment,
- IDBs & Primary Dealers,
- Liquidity & Depth,
- Yield Quoting Convention,
- Jargon such as "Yours", "Mine", "Double", Arbitrage, long \ short etc.

5. Types of Money Market Instruments & Bonds

- NCDs, Jibar & Libor, SOFR
- Commercial Paper & Promissory notes;
- Some global Government Bonds;
- South African Government Bonds;
- Zero Coupon Bonds and why they are different;
- STRIPS;
- Amortising Bonds;
- Floating Rate Notes (FRNs);
- Inflation Linked Bonds;
- Asset Backed Securities & Securitisations;
- Eurobonds etc.

6. Deriving Yield to Maturity from the All in Price

- Numerical Techniques
- Bi-section
- Newton-Raphson
- Bailey's method

7. A detailed look at measuring Interest rate Risk

- The truth about Macaulay Duration and how it has been misinterpreted.
- Calculating the first and second derivatives of the Price / Yield function.
- Modified Duration, Delta and PV01.
- Fisher-Weil Duration.
- Derivation, explanation and practical uses of convexity.
- Interpretation and uses of duration and convexity.
- The JSE specification regarding Duration, Convexity, Delta and PV01.

Excel will be used to reinforce the concepts. Please note that this section uses calculus. Background reading regarding the concepts of calculus will be made available for those who are a bit rusty and want to recap the concepts.

8. Pricing Inflation Linked Bonds

- Understanding and calculating the reference CPI.
- Explanation of how CPI bonds work.
- Pricing Inflation Linked Bonds.

Delegates will perform the calculations in Excel.

9. *Repos*

- Understanding Repos and Buy Sell Backs.
- GC, Special and securities Lending.
- Pricing Buy Sell Backs and Repos.
- The consideration method.
- ISMA Repos (now ICMA Repos)
- Pricing Inflation linked Repos and the implications.

Again Excel will be used.

10. Understanding Yield curves

- Understanding the Par curve.
- Applying yield curve shapes & movements.
- Traditional yield curve theory
- Understanding par curve weaknesses.
- A detailed look at the zero curve.
- Bootstrapping the Zero curve.
- Why bootstrapping is not as simple as it looks.
- Pricing bonds off the Zero curve.
- Deriving the par rate from Zeroes.
- Deriving the forward curve.
- Pricing bonds off the Forward curve.
- Deriving the zeroes from the Forward curve.
- "Jumps" in the forward curve.
- A recap of Decomposing Yield To maturity into spreads.
- Understanding the inconsistency of ratings spreads.
- Implying the probability of default from curves.
- Best fit curves versus perfect fit.
- polynominal functions with Excel.
- Nelson-Siegel Term structure.
- The Nelson-Siegel-Svensson model.

This section will use some multimedia animations and delegates will bootstrap curves in Excel.

11. An Introduction to Interpolation

- Bootstrapping in reality - what to do when you have gaps.
- Piecewise Linear Interpolation
- A high level overview of Quadratic splines.
- A high level overview of Cubic Splines
- A high level overview of other Curve techniques and a discussion on the Monotone Preserving Interpolation.
- A discussion of the weaknesses and strengths of the fitting techniques.

Delegates will fit a curve using Excel and the interpolation techniques above.

12. Pricing FRN's

In order to price FRN's, one needs to understand Yield Curves.

- Bootstrapping the Spot Curve.
- Deriving the Forward Curve and predicting coupons.
- The FRN pricing formula and its anomalies.
- FRN duration and convexity.

Delegates will price all of the FRNs themselves using Excel. Video be used to reinforce the concepts.

13. Bond Portfolio's

- Mathematics of Bond Portfolio Management.
- Reinvestment Risk
- Bond Portfolio duration, convexity, PV01 and delta of the portfolio.
- Weighting & Replication
- Barbell's, Ladders and Bullets.
- Yield curve shifts.
- Delta neutral portfolios.
- "The saw tooth effect" on Portfolios.

14. Interest Rate SWAPS & FRAs

- What they are, how they work & why they are so important.
- SWAPS and FRAS jargon.
- Why Banks needs SWAPS & FRA's (ALCO).
- Asset SWAPS
- Applications for Corporates, Asset Managers & Insurance companies.
- Simplistic Valuation of SWAPS and FRAs.
- The SWAP curve
- MTM of SWAPS
- Some Non-vanilla Interest Rate SWAPS such as Amortising SWAPS, Roller coasters,Off Market SWAPS, Yield Curve and Basis SWAPS, Equity SWAPS, Exchange Traded SWAPS, OIS etc.

Tutor: Mark Raffaelli CFA,FRM

Mark is a practising CFA Charterholder and fellow member of the Global Association of Risk Professionals (FRM). Mark's extensive experience includes:

- Trading in Spot & Derivative Products professionally.
- Development of quantitative financial models for surveillance, performance attribution, price validation, price models, risk and automation.
- Developments of Apps for the investment and insurance industry.
- Machine Learning and Deep Learning with Sklearn and Tensorflow in the Financial Markets for Banks, Asset Managers and general business.
- Trading in Spot & Derivative Products professionally.
- Fund & Bank consulting regarding valuations, curves, Var, surveillance and market abuse.
- Mark programs in: Python, Javascript (including Angular and Ionic), Php, Excel VBA, JAVA & ".net".

Those who have attended Mark's courses will know about his passion and ability to cut through jargon, simplify technical issues and provide real life examples.

What makes Geometric Progression different from other providers:

- We don't regurgitate traditional textbooks; instead we share real life experiences.
- We explain all the products as they relate to your own lives in plain English.
- We practice what we preach.
- We love multimedia and include video and film in all our courses.
- We are one of the few providers that offer advanced courses relating to the financial markets, modelling and implementation.

Things delegates have said about this course:

- "*Very good course and well presented! The content opened my eyes to the fixed income market.*
- *Mark presented the course in an easy to understand manner, yet he covered the complexity of all of the topics.*"
- "*I have learned a lot from this course and it is very relevant to what I do at work. Mark made the terms much simpler and more understandable*."
- "*Mark has the ability to explain difficult terminology very simplistically. This, coupled with his practical market experience and enthusiasm made the course very interesting*."
- "This is the only course I have attended where the bond markets have been explained in plain English that everyone can understand."
- "Mark gets 11 out of 10 for passion, energy and enthusiasm!"

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