

Geometric Progression

Creative Disruption

Yield Curves & SWAP Curves: Interpolation & Analysis.

Overview

This course is intended for practitioners in the financial markets who already have an understanding of the Bond Market and would like to learn more about Yield Curves in extensive detail. The course covers everything from the different types of curves (including SWAP Curves and Blended curves), yield curve construction using different interpolation techniques as well as yield curve analysis. This is a **"hands on"** course and delegates will bootstrap and construct the different curves themselves using Excel. Furthermore, the concept of bond spreads and swap spreads is discussed in detail. It is strongly recommended that delegates bring their own laptops. 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 on a DVD.



We discuss all of the details of curves including:

- Understanding par curves and their weaknesses;
- The Zero /spot curve;
- The forward curve;
- Using spot rates and forward rates for valuations;
- Bootstrapping the zero curve in reality using Excel;
- Deriving the forward curve.
- Best fit curves
- Regressions with Excel
- Polynomial functions with Excel.
- Nelson-Siegel Term structure.
- The Nelson-Siegel-Svensson model.
- Interpolation methods using Excel (no VBA required).
- Linear, Quadratic, Cubic splines, The Hermite spline ,The Quartic spline.
- The Monotone preserving method;
- Strengths and weaknesses of the different interpolation methods.
- Explanation of Swaps and FRAs.
- The relationship between SWAPS, FRAs and Bonds.
- Why the SWAP curve is a PAR curve.
- Putting together a blended curve.
- The SWAP curve anomaly.
- Spread trading.
- Spread trading quotes.
- Swap spreads

Please refer to the agenda for more info.

Geometric Progression is accredited as a provider of education and training by BANKSETA. Accreditation number: 557066.

We are a B-BBEE level four contributor. We have a B-BBEE procurement recognition level of 100%. The rating was performed by the Department of Trade and Industry (the DTI).

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Level: From Intermediate to Advanced

Duration: 4 Days. (8h30 - 16h30)

Prerequisites

Please note, this course assumes delegates know the features and characteristics of bonds already. Please refer to the "Comprehensive Introduction to Money Markets & Bonds Course" for more details of the introductory bonds course offered by Geometric Progression.

Furthermore this course assumes you understand:

- The Basics of the Time value of money (FV, PV);
- Fundamental aspects of pricing spot bonds and spot money markets instruments.
- The concepts of trading e.g. bid, offer, yours, mine etc.
- Introductory knowledge of Equation solving e.g. Linear algebra. Please note that we will use Excel to solve the equations and hence understanding linear algebra and matrices is not essential as all key aspects will be available as pre-reading and recapped at the course.
- Elementary calculus i.e. being able to calculate the first and second derivative.
- The basics of how to use Excel.



All 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. A CD of these topics will also be provided at the course.

Suitable for

All Treasury staff from Back office through to Front Office including:

- Business analysts;
- 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 Yield curves.

A certificate is available on request

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Agenda

1. Understanding PAR curves

- A recap of Decomposing Yield To maturity into spreads.
- Understanding the inconsistency of ratings spreads.
- Implying the probability of default from curves.
- Understanding the Par curve.
- Applying yield curve shapes & movements.
- Traditional yield curve theory from pure expectations theory to preferred habitat.
- Understanding par curve weaknesses.



This section will use some multimedia animations.

2. Understanding Zero / Spot curves

- 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.

Delegates will perform a bootstrapping themselves, starting with simplistic exercises and build up to a live example using Excel.

3. Understanding the forward curve

- Deriving the forward curve.
- Pricing bonds off the Forward curve.
- Deriving the zeroes from the Forward curve.
- "Jumps" in the forward curve.

Again, delegates will derive the forward curve themselves, using Excel. Delegates will start with simplistic exercises using different compounding conventions and build up to a live example using Excel.

4. Best Fit Curves

- Regressions with Excel.
- Polynomial functions with Excel.
- Nelson-Siegel Term structure.
- The Nelson-Siegel-Svensson model.

Delegates will use the above methods to create "best fit" curves using Excel (no VBA required). Note we will make use of Excel solver and toolpacks. All of these Excel features will be taught at the course.

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5. Interpolation

- Bootstrapping in reality - what to do when you have gaps.
- Piecewise Linear Interpolation
- Quadratic splines.
- Cubic Splines including the Hermite spline
- Quartic Splines and other techniques.
- 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. Please note that this section requires the use of matrices. Although Pre-reading and video will be made available before the course to help delegates recap the basics of Linear algebra that they need to know, we will use the Excel tools to do the "tough" calculations.

6. Understanding SWAPS & FRAs and how they relate to the Bond Market

- Explanation of Swaps and FRAs.
- The relationship between SWAPS, FRAs and Bonds.
- Why the SWAP curve is a PAR curve.
- The framework of SWAP and FRA valuation.

Delegates will price SWAPS and FRA's using Excel.

7. The SWAP Curve and Blended curves

- Using live data to derive the blended curve.
- The credit curve.
- The chicken or the Egg
- Using spot rates, FRA's and SWAPS to blend a credit JIBAR / LIBOR curve

Delegates will create a linear blended curve using current data.

8. Spread trading

- Understanding the concept of spreads and spread trading.
- Pairs trading.
- Bond Spread trading and RPBP neutral.
- Quote conventions.
- The Swap spread and what influences it.
- The negative swap spread.
- The I spread, G Spread, T spread and Z spread.

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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.
- Fund & Bank consulting regarding valuations, curves, Var, surveillance automation for Mifid II and local legislation etc.
- Development of quantitative financial models for surveillance, performance attribution, price validation, price models, risk (in particular Var) and automation.
- Developments of Apps for the investment and insurance industry.
- Mark programs in: Python, Javascript (including Angular and Ionic), Php, Excel VBA, R and ".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 i.e. We are an authorised Financial Services Provider (License no:43244).
- 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.

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