

FIXED INCOME

Dr. Jeroen Kerkhof

Jeroen Kerkhof is currently a Director at VAR Strategies BVBA, a consultancy and analytics firm in the area of financial engineering & risk management. He is also the academic director of the advanced master in Quantitative Finance at Solvay Brussels School, a visiting lecturer at Imperial College business school in London and was a visiting lecturer at Singapore Management University in Singapore. Previously he was Head of non-linear rates at Danske Bank in Copenhagen, Head of Analytics at Jefferies, Head of Interest Rate and Inflation Desk Strategies at Morgan Stanley Europe, a Director in the Fixed Income Modelling Group at Lehman Brothers and he was in the Product Development Group at ABN-Amro Bank in Amsterdam during his PhD. Jeroen's work focuses on interest rate, inflation and interest rate hybrid derivative products. He holds a PhD in Quantitative Finance from CentER at Tilburg University (Netherlands) and has published several articles in international refereed finance journals.

Course Outline

In this course we will present an overview of some of the latest practices in the fixed income market and its theoretical foundations. Since the financial crisis from 2008 fixed income markets drastically deviated from the text-book settings and we will discuss new models for this new paradigm. In this course the emphasis will lie on the quantitative methods (both stochastic calculus and financial econometrics) for valuation and risk-management of fixed income markets / products. Topics include 1) bonds and swaps portfolio management, 2) fixed income option pricing and risk-management, 3) inflation bonds and swaps. The course will involve (programming) assignments in Python to get hands-on experience with the treated models.

At the end of the course, Participants will be able to:

- understand linear and non-linear interest rate derivatives and the market standard models for these products
- understand the risk management of interest rate derivatives
- understand inflation derivatives and how to use them in practice
- know how to program many of the models treated in the course

Course Structure

- I. Linear Interest-Rate Derivatives**
 - a. Forwards, Swaps, Tenor-basis swaps
 - b. Curve building
 - c. Multi-curve building / OIS discounting
 - d. Portfolio valuation / risk management
- II. Non-linear Interest Rate Derivatives**
 - a. Caps / Floors / Swaptions
 - b. Deterministic volatility models
 - c. Stochastic volatility models (e.g. SABR / ZABR / Heston)
 - d. Risk management
- III. Inflation Derivatives**
 - a. Inflation Swaps
 - b. Inflation curve building (incl. Seasonality adjustment)
 - c. Portfolio valuation and risk management