

Risk

Patrick Hagan



Fixed Income

Hong Kong

1 & 2 December 2011



Course Highlights:

- Using the SABR model to manage volatility smiles and hedging stability
- Market technicals: money vs. scrip, leverage, cost of funds and the credit crisis
- Managing exotic risks: choosing a model and the five main interest rate risks
- Practical pricing of exotics: calibration strategies and instruments
- Adjusters and risk mitigation
- Pricing and hedging callable range notes and accrual swaps

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Risk

The course

This course looks at Fixed Income in today's volatile market conditions. It provides a practical and technical approach to managing the various risks involved in Fixed Income, with content driven by real-world implementation strategies.

The agenda addresses the practical pricing issues of Fixed Income and cutting-edge hedging techniques.

The course will be led by Patrick Hagan, a leading expert in the area of Fixed Income modelling with a wealth of experience in building trading models at many international

investment banks. He has designed this course to address the industry's need to adapt its approach to Fixed. This masterclass will offer practical insights whilst remaining mindful of recent market turbulence and change.

The main motivation for delegates attending this course will be to learn the correct application of models and to execute more effective Fixed Income strategies.

The course will address how to develop, calibrate and validate models in order to minimize and manage model risk and guarantee robustness.

Who should attend?

This course has been designed for those working in investment banks, hedge funds, insurance companies, consultancies and regulatory bodies with the following job titles:

- Risk managers
- Risk analysts and controllers
- Derivatives analysts
- Quantitative analysts
- Treasurers
- Financial engineers
- Market risk managers

Key Learning points

- Assess the use and application of the SABR model
- Develop your understanding of the practical pricing of exotics
- Explore the strengths, weaknesses and uses of HJM models, BGM models, LMM models, short-rate models and Markovian models
- Investigate mis-hedging, mis-pricing and the need for risk migrators

About the tutor

Patrick S. Hagan,
Head of Quantitative Analytics for
JP Morgan's Chief Investment Office

Patrick received his BS and Ph.D. in Applied Mathematics from the California Institute of Technology. Before joining JP Morgan he worked for several banks and third party software providers designing trading systems, as well as developing the component models, calibration methods and numerical algorithms for pricing,

structuring and managing derivatives. Before entering finance, he helped design chemical reactors for Exxon, was a scientist for Los Alamos's Theory and Computer Research & Applications groups and was the Deputy Director for the Los Alamos Center for Nonlinear Science. He is a former Director of the US Industrial Study Group, has taught at Stanford University, the California Institute of Technology and the Courant Institute (NYU) and is an Adjunct Professor at several other institutions.



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Day one

09.00 Registration and coffee

09.30 Basic fixed income instruments

- Basics: discount factors, FRAs, swaps, and other delta products
- Curve stripping, bucket deltas, and managing IR risks
- Martingales & the fundamental theorem
- Vanilla options (caps, floors, and swaptions) & Black's model
- Vol matrices, bucket vegas, and managing vol risks
- Smiles, local volatility models, and equivalent volatilities
- Mishedging, and the development of the stochastic vol model
- Using the SABR model to manage volatility smiles, hedging stability
- Levy based models for managing volatility surfaces

11.00 Morning Break

11.30 *Speed networking: a chance to meet each delegate and share backgrounds*

11.45 Intermission: market technicals

- money vs. scrip
- holiday calendars, business day rules, and schedule generation
- day count fractions
- ref rates & basis spreads
- leverage, cost of funds, and the credit crisis

13.15 Lunch

14.15 Managing exotics

- Three elements to modern pricing: model, calibration, and evaluation
- Choosing a model and the five main interest rate risks
- HJM models – strengths, weaknesses, usage
- BGM/LMM models – strengths, weaknesses, usage
- Short rate models – strengths, weaknesses, usage
- Markovian models – strengths, weaknesses, usage

15.45 Afternoon break

16.15 Review of day's content

- Technical review
- Discussion
- Common problems faced
- Strategies to overcome common mistakes

17.00 End of day one

Day two

09.00 Registration and coffee

09.30 Practical pricing of exotics

- LGM model
- Callable swaps (Bermudans)
- Calibration strategies and the selection of calibration instruments
- Connection between calibration instruments and vega risks
- Explicit calibrations for Bermudan
- Predicted vs. actual vol matrices for different calibrations
- Dependence of Bermudan price on choice of calibration instruments
- Dependence of hedges on calibration choices
- Conclusions

11.00 Morning break

11.45 Adjusters and risk migration

- Mis-hedging, mis-pricing, and the need for risk migrators
- Price sharpening via adjusters
- Example: correcting a Bermudan calibrated to ATM swaptions
- Example: correcting a Bermudan calibrated to caplets

13.15 Lunch

14.15 Pricing/hedging callable range notes & accrual swaps

- Definition of the deal
- Mismatched payoffs & convexity corrections
- Using replication to price non-callable range notes
- LGM model and potential calibration strategies
- Potential mishedging of swaption or caplet risks
- Using internal adjusters to correct prices and hedges

15.45 Afternoon break

16.15 Review of course content

- Technical review
- Discussion
- Action points

16.45 End of the course

Risk

Patrick Hagan on Fixed Income

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