

YIELD CURVE & INTEREST RATE MODELING

Quantitative
Finance Programs

COURSE SUMMARY:

Fixed Income Instruments & Analytics Day 1

Yield Curve Construction with Futures & Swaps Day 1

Constructing the Yield Curve With Bond Data Day 2

Interpolation Techniques Day 2

Tax-Specific Yield Curves Day 2

Interest Rate Models Day 3

Course Dates

Dec 8, 9, 10, 2004

New York

One day programs also available

Who Should Attend

- ✓ Quantitative Analysts
- ✓ Economists
- ✓ Portfolio Managers
- ✓ Fixed Income Traders
- ✓ Derivative Strategists
- ✓ Risk Analysts

Course Leader:



Jonathan Kinlay
Hedge Fund Manager
The Proteom Fund
Adjunct Professor of
Finance

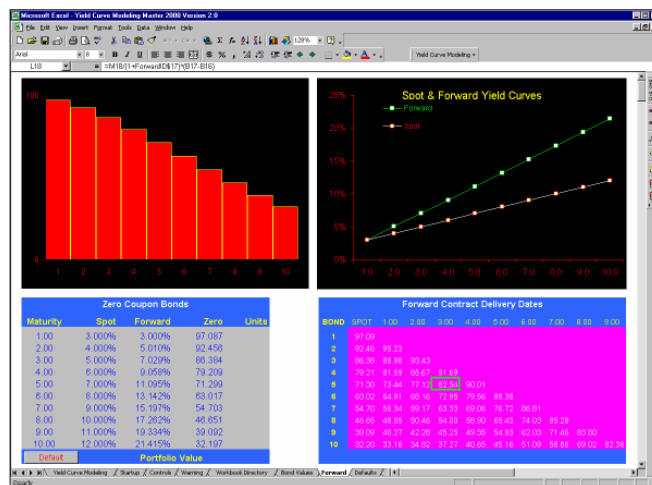
A 3 DAY COURSE PROVIDING A COMPREHENSIVE AND PRACTICAL REVIEW OF QUANTITATIVE TECHNIQUES IN YIELD CURVE & INTEREST RATE MODELLING.

About This Course

Yield curve and interest rate modeling provides the basis for structuring, pricing, trading and hedging every class of interest rate contingent securities from bonds to fixed income derivatives. It is consequently of fundamental importance in every aspect of fixed income research, trading and investment.

This course is designed to provide practitioners with a comprehensive understanding of the **latest theoretical concepts and analytical methods** and their applications in fixed income investment.

The emphasis of the course is practical rather than purely theory-based. Delegates will make extensive use of computer-



Forward rate modeling & contract pricing

based labs and modeling exercises using actual market data to ensure a thorough understanding of the various methodologies and how they are applied. As a result, delegates will find that **the techniques covered in the course are immediately useful** to them in the work envi-

ronment.

The coverage of the course includes applications in emerging markets, as well as fixed income derivatives. A complementary course on Bond Trading and Portfolio Management (for which this course is a pre-requisite) is also available.

WHAT YOU WILL LEARN FROM THIS COURSE

This comprehensive course will enable you to:

- ◆ Construct advanced yield curve models to give accurate valuations of fixed income products.
- ◆ Identify profitable trading opportunities in securities trading rich or cheap relative to the curve.
- ◆ Apply numerical techniques to ensure the construction of smooth, continuous forward rate curves for consistent swaps & derivatives pricing.
- ◆ Identify tax-efficient bonds and construct tax-specific yield curves & investment strategies.
- ◆ Learn the latest multi-factor interest rate modelling techniques for valuing interest rate derivative securities.

Previous Delegates

- ◆ Salomon Brothers
- ◆ Chase/ JP Morgan
- ◆ Bankers Trust
- ◆ Credit Suisse
- ◆ Merrill Lynch
- ◆ Deutsche Bank
- ◆ ABN-AMRO
- ◆ NatWest Markets

What delegates say about our courses

“Builds a foundation of the essentials of constructing yield curves. Very comprehensive, very complete.”

“Best course I have taken in the last two years.”

“The content of the class is extremely valuable. Presentation is outstanding. The organization of this session is excellent.”

“A wealth of material is presented and the media used to deliver it is effective, affording the participant with valuable hands-on experience with spreadsheet and other software.”

“Practicality & theory made fun, together with interesting tools and exercises makes this class excellent!”

“Excellent fusion of theory and practical example”.

“Lecturers clearly demonstrated their mastery of subject matter.”

DAY 1– YIELD CURVE THEORY

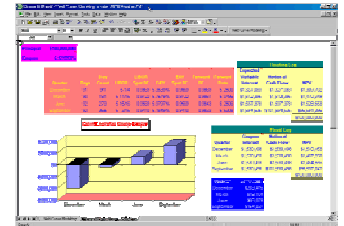
Morning

Fixed Income Markets & Analytics—Review

- Compounding & discounting
- Spot & forward rates
- Treasury securities
- Yield & price calculations
- Repo & reverse markets
- LIBOR spot & forward markets

- FRA's
- Interest rate futures
- Interest rate swaps
- Duration & convexity
- Theories of the Yield Curve**
- The yield curve defined
- Simple construction techniques
- The duration yield curve
- LIBOR & swaps curves
- Expectations theory
- Empirical tests
- Liquidity theory

- Risk theory
- Yield curve movement
- Yield volatility



Interest rate swap pricing

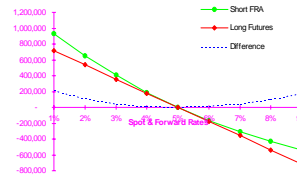
Afternoon

Constructing the Yield Curve with Futures & Swaps

- Spot-forward discount factor relationship
- Constructing the short end
- Combining cash and FRA rates
- Linear interpolation
- Deriving the forward rate curve from futures
- Backing out the spot

yield curve

- Zero coupon, LIBOR and continuously compounded curves
- Futures, FRAs and convexity



FRA vs futures convexity

- Burghardt & Hoskins methodology
- Convexity adjustment factors
- Constructing convexity-adjusted yield curves
- Bootstrap method with swaps
- Extending the curve with swaps
- Comparing swap and spot rate curves

LABS & MODELLING EXERCISES

Forward Rates

Delegates estimate a yield curve and price forward contracts.

Repo Cash & Carry

Delegates construct a repo cash and carry arbitrage trade.

Swap Pricing

Delegates construct and price a vanilla interest rate swap.

Constructing the Short End of the Curve

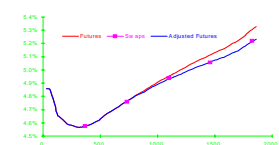
Delegates construct the short end of the curve using a combination of cash and FRAs.

FRA-Futures Convexity

Delegates compare the relative convexity of equivalent FRA and futures portfolios.

Delmar Capital

Delegates construct spot and forward yield curves using interest rate futures and swaps, calculating and applying convexity adjustment factors as necessary.



Curve construction with futures & swaps

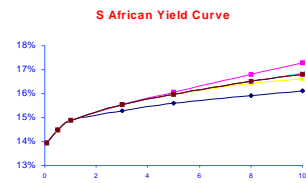
DAY 2—YIELD CURVE CONSTRUCTION

Morning

Constructing the Yield Curve with Bonds

- Apply the bootstrap method with bonds
- Limitations of bootstrapping
- Multiple regression techniques
- Bond pricing as a regression model
- Constructing the yield curve using regression

- Confidence intervals for the yield curve
- Validating the regression model
- Goodness of fit and residuals tests
- Modeling credit risk factors
- Emerging market yield curve construction
- Iterative methods for constructing the curve



Iterative construction

Interpolation Techniques

- Why interpolation is necessary
- Interpolation methods
- Linear interpolation & its drawbacks

Course Leader:



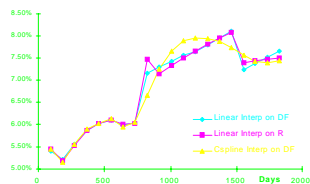
Jonathan Kinlay
Hedge Fund Manager
Adjunct Professor of Finance

“ The knowledge and experience of the instructor was tremendous. I have worked at top Wall Street firms for ten years and judge him to be at the upper ranks of those I have come into contact with.”

Afternoon

Interpolation Techniques

- Cubic spline interpolation
- Cubic spline formulation & methodology



Cubic spline interpolation

- The pro's and con's of spline interpolation
- The colinearity problem
- Basis splines
- Modeling the discount function with basis splines
- Combining regression and basis splines
- Post tax yields and spot rates
- Tax efficiency
- Tax clientele effects
- Identifying tax-efficient securities
- Tax arbitrage
- Linear programming techniques
- Building tax-specific yield curves
- Combining regression, LP and spline techniques

Taxable Yield Curves

- How tax affects the yield curve and relative value

About your course leader

Jonathan Kinlay has advised multinational corporations and financial institutions in Europe, North America and Africa over a period of 16 years in the areas of financial engineering, quantitative analysis and risk management, initially with NatWest Bank and subsequently Chase Manhattan Bank. He subsequently worked as head of quantitative analysis and proprietary trading in a European hedge fund, trading US and European fixed income and OTC & exchange traded derivatives in fixed income, foreign exchange, stocks and commodities.

Mr Kinlay has taught advanced courses in trading and financial engineering as an Adjunct Professor of Finance at leading US and European Universities, including the Universities of Cambridge, Oxford and Reading and at Carnegie Mellon University in New York.

LABS & MODELLING EXERCISES

Building a Yield Curve Regression Model

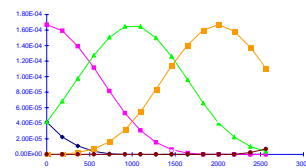
Delegates construct a yield curve from bond data using a regression analysis model.

Building a Yield Curve with Cubic Splines

Delegates apply cubic spline interpolation methods to construct a smooth, continuous forward rate curve and compare the results with linear interpolation.

Building a Yield Curve with Basis Splines

Delegates apply regression analysis and basis splines to estimate the discount function and hence construct the yield curve.



Basis spline algorithm

Tax Analysis of Bonds

Delegates investigate the impact of taxation of bond values and zero coupon yields.

Pencoa Fund Management

Delegate apply a combination of linear programming, regression and basis spline interpolation techniques to identify tax-efficient bonds and construct taxable yield curves for specified tax-clienteles.

DAY 3—INTEREST RATE MODELS

About Our Courses

Our training courses are thoroughly researched and structured to provide intense, practical training directly applicable to your organization.

Our instructors combine academic excellence and teaching experience at top Ivy-league schools with practical experience in trading, investing and quantitative analysis at leading financial institutions.

All of our courses make extensive use of analytics software, modelling exercises and case studies using real market data, to ensure that delegates consolidate their understanding of theoretical concepts and learn how to apply them in practice.

Benefits include:

- ◆ Strictly limited numbers
- ◆ Pre-course questionnaire
- ◆ Tailored program to address individual needs
- ◆ Practical workshops and modelling exercises
- ◆ Extensive use of analytics software tools
- ◆ Comprehensive course documentation

Morning

Bond Price Models

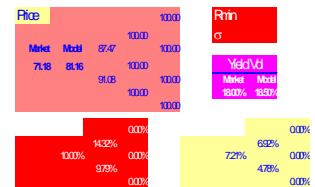
- Black-Scholes model
- Black's model
- Bond option pricing
- Caps, floors & collars
- Swaption pricing
- Black's model limitations

Interest Rate Models

- General interest rate model
- Market price of risk

- Desirable model properties
- Taxonomy of interest rate models
- Single factor models
- The short rate process
- Binomial tree models
- Markovian property
- Vasicek model
- Cox, Ingersoll, Ross
- Ho & Lee model
- Hull & White
- Black, Derman, Toy

- Model calibration
- Volatility term structure
- Derivative valuation
- Greek parameter estimation
- Trinomial tree models



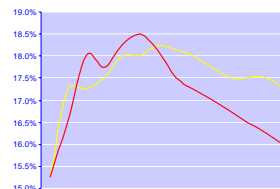
BDT model calibration

Afternoon

Multifactor Models

- Limitations of single factor models
- Theoretical framework for multifactor models
- Brennan & Schwartz
- Fong & Vasicek
- Longstaff & Schwartz
- Hull & White
- Heath, Jarrow, Morton
- HJM and spot rate models
- Non-Markovian prop-

- Property of HJM
- Principal components analysis
- PCA of the yield curve



Volatility term structure modeling

- Monte-Carlo simulation
- HJM & Monte-Carlo
- Greeks estimation with MCS
- Box-Muller, Faure & other random number generators
- Variance reduction techniques
- Monte-Carlo vs lattice methods
- Brace, Gatarek & Musiela model

LABS & MODELLING EXERCISES

Applying Black's Model

Delegates apply the Black (76) model to price caps and floors, and construct a zero-cost collar.

Hull White Model Calibration

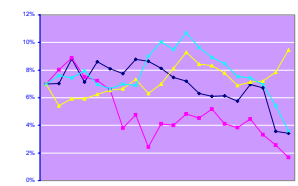
Delegates calibrate a Hull-White model using caps data and compare the results to Black (76).

Bond Option Valuation with BDT

Delegates construct a BDT model process, calibrated to the yield and volatility term structures, and apply the model to price bond options and estimate Greek sensitivity parameters.

Swaption Pricing in the HJM framework using Monte-Carlo Simulation
Delegates construct a

multi-factor HJM interest rate model, using Monte Carlo simulation techniques to price swaption contracts.



HJM forward rate paths

BOOKING FORM & CONTRACT

Please complete this form and fax back to:

Fax #: 1-(212) 208 2492

Sign up for:	Date	Fees
<input type="checkbox"/> Yield Curve & Interest Rate Modeling	Dec 8-10	\$4,200 *
<input type="checkbox"/> One day of program (indicate which)	8 9 10	\$1,500*
	Total	_____



BOOK 3 PLACES AND 4TH DELEGATE IS FREE!

Name _____
 Position _____
 Organization _____
 Address _____

 City State Postcode _____
 Phone _____
 Email _____

Cardholder Name _____
 Billing Address _____

Payment

- Visa
- MasterCard
- American Express

City State Postcode _____
 Phone Email: _____
 Exp. date _____

Credit Card # _____
 Signature _____ Date: _____

UPCOMING COURSES

Please send me details of the following courses

- Advanced Quantitative Methods in Finance
- Bond Trading
- Credit Risk & Credit Derivatives
- Derivative Strategies
- Forecasting Financial Markets
- Risk Management
- Structured Products
- Swaps & Derivatives

TERMS & CONDITIONS

Cancellation

By completing this registration form the signatory hereby agrees that Investment Analytics will not be able to mitigate its losses for any less than 50% of the total contract value. Cancellations must be received by email or fax three weeks before the conference date. Delegate substitutions are welcome at any time. Thereafter the full conference fee is payable. If for any reason Investment Analytics decides to amend this program, we are not responsible for any

airfare, hotel charges or other expenses or costs incurred by the registrants. In the event that Investment Analytics cancels the event, Investment Analytics reserves the right to transfer this booking to another conference to be held in the following twelve months or to provide a credit for an equivalent amount to another conference.

Indemnity: The client hereby indemnifies and holds Investment Analytics harmless from and against all costs charges and expenses, including legal fees, which are incurred by

the client. The construction validity and performance of this agreement shall be governed in all respects by the laws of the Bahamas, the exclusive jurisdiction of whose courts the Parties hereby agree to submit.



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Investment Analytics provides independent research focusing on applications of sophisticated mathematical and financial modeling techniques to problems of strategy development and repair, performance analysis and risk management for clients in the investment management industry in Europe and North America.

Our methodology represents a radical departure from traditional methods of research and is based instead on advanced techniques of quantitative finance that have proved highly successful in tackling complex problems in financial engineering and investment analysis. Investment Analytics has applied these powerful and robust techniques to the field of equity analysis, to bring fresh insights and a whole new approach to investment research

