Dr. Attilio Meucci, CFA

Advanced Risk and Portfolio Management

the only heavily quantitative, omni-comprehensive, intensive buy-side bootcamp

12th, 13th and 14th May 2008

Venue: Instituto Educacional
São Paulo, Brazil - Rua Boa Vista, 280 - 11th Floor - Auditorium

Course Highlight

The course covers all aspects of quantitative risk and portfolio management from the foundations to the newest developments.

Statistics: multivariate distributions, copulas, location-dispersion ellipsoid, correlation and other measures of co-dependence;

Multivariate estimation: non-parametric, maximum-likelihood under thick tails, shrinkage, robust, Bayesian, extreme value theory;

Market modeling: quest for invariance in different markets, advanced dynamics, factor models, principal component analysis;

Pricing: FFT projection to horizon, delta-gamma approximation, full Monte Carlo;

Portfolio evaluation: stoch. dominance, satisfaction, utility/certainty equivalent;

Risk management: value at risk, expected shortfall, coherent measures, risk decomposition in elliptical and generic markets;

Classical portfolio management: trading/prospect theory, total return management, benchmark allocation, mean-variance and pitfalls;

Advanced portfolio management: mean-CVaR, mean-VaR, Black-Litterman and beyond, copula opinion pooling, Bayesian, robust cone programming;

Liquidity: transaction costs, optimal execution, algorithmic trading

The most advanced statistical and optimization techniques are introduced and thoroughly discussed by means of live MATLAB® simulations, intuitive geometrical representations, figures and plenty of examples.

The course is based on Dr. Meucci's bestseller *Risk and Asset Allocation – Springer*. Delegates will be given a complimentary copy of the book, as well as all the code used in the live demos.

Audience

Buy-side practitioners (portfolio managers and risk managers with solid quantitative background) will deepen and broaden their understanding of the recipes they implement everyday and will learn the most cutting-edge techniques.

Academics and **sell-side practitioners** (traders, financial engineers, quantitative analysts, research teams) will understand the big-picture and the details of buy-side finance in a quantitative language to them familiar.

Attilio Meucci

- Senior Vice President Lehman Brothers
- Adjunct Professor MFM, Courant-NYU
- CFA chartholder
- PhD Mathematics
- MA Economics
- BA Physics cum laude

learn more at
www.symmys.com

Charity Support!

In particular, Attilio Meucci will not be paid to teach this course.

To register and for more information

Visit: www.bmf.com.br/seminariorisco
Alternatively, send inquires to cursos@bmf.com.br
Or call + 55 11 3119-2180

Day 1 – Monday, 12 may 2008

Morning Session (8:30-12:30)
Multivariate Statistics

Representations of distributions
- analytical (pdf, cdf, quantile, cf)
- Monte Carlo simulations

Copula-marginal factorization
- marginals/grades
- pdf, cdf, simulations of copulas
- special copulas

Dependence / concordance statistics
- Schweizer-Wolff measure
- Kendall tau
- Spearman rho

Summary statistics
- location-dispersion ellipsoid
- principal component factorization
- higher order statistics

Correlation: theory, practice and pitfalls

Multivariate distributions for the markets
- (matrix-variate) normal
- Student t and elliptical
- Log-distributions
- Wishart distribution
- Order statistics
- Mixture distributions

Afternoon Session (14:00-18:00)
Multivariate Estimation

Estimators: definition and evaluation
- loss, bias, inefficiency, error
- generalized hypothesis testing

Non-parametric estimators
- order statistics and VaR estimator
- sample mean/covariance: best-fitting ellipsoid
- sample factor loadings: ordinary least squares

Multivariate MLE: location, scatter, loadings
- normal hypothesis: sample estimators
- non-normal hypothesis: outlier rejection

Multivariate shrinkage: location, scatter, loadings
- Stein mean
- Ledoit-Wolf covariance

Multivariate robust: location, scatter, loadings
- assessing robustness: the influence function
- M-robust estimators
- outlier detection and high-breakdown ellipsoid

Multivariate Bayesian: location, scatter, loadings
- analytically tractable examples
- numerical techniques

Missing observations and unbalanced panels
- EM algorithm
- ML marginalization

Day 2 – Tuesday, 13 May 2008

Morning Session (8:30-12:30)
Market Modeling

The quest for invariance: i.i.d. processes
- equities: log-returns
- fixed-income: changes in yield to maturity
- derivatives: changes in ATM implied volatility

Advanced dynamics
- Levy processes
- ARMA, long-memory processes, self-similarity
- GARCH, stochastic volatility, subordination
- multivariate generalizations

Projection to horizon: the FFT technique

Pricing
- analytical
- second-order (gamma/convexity)
- full Monte Carlo

Dimension reduction
- Principal component analysis
- Explicit factors

Afternoon Session (14:00-18:00)
Risk Management

Dimension reduction, notable examples
- Capital Asset Pricing Model
- Multi-factors models
- PCA of the swap market

Investor's objectives
- Total return
- Benchmark allocation
- Net profits

Global portfolio evaluation: stochastic dominance

Summary portfolio evaluation: satisfaction
- non-dimensional indices (Sharpe, info ratio)
- expected utility and certainty-equivalent
- quantiles and value at risk (VaR)
- coherent measures and exp. shortfall (CVaR)
- spectral measures of performance

Volatiliy / VaR / CVaR / Risk decomposition
- elliptical markets: semi-analytical
- generic markets: Monte Carlo panel smoothing

Day 3 – Wednesday, 14 May 2008

Morning Session (8:30-12:30)
Portfolio Management I

Constrained optimization: computationally tractable problems
- linear and quadratic programming
- second order and semi-definite cone programming

Mean-variance optimization
- analytical: two-fund theorem
- numerical: quadratic programming
- pitfalls of the mean-variance approach

Total return vs. benchmark allocation

Market asymmetries: mean-CVaR optimization

Estimation risk: allocations as decisions
- opportunity cost
- allocation decisions evaluated as estimators

Simple allocation techniques
- general equilibrium/benchmark implied allocation
- prior allocation
- sample-based allocation

Afternoon Session (14:00-18:00)
Portfolio Management II

Bayesian allocation
- predictive return
- classical-equivalent

Black-Litterman allocation
- views on parameters
- views on market

Beyond Black-Litterman: non-normal markets

Robust allocation (SOCP)
- elliptical uncertainty sets
- box uncertainty sets

Robust / Bayesian allocation

Liquidity issues
- trading costs (fixed, execution, opportunity)
- implementation shortfall: temporary vs permanent impact
- optimal execution of one-security trades
- trading portfolios: the multivariate case