

ATTILIO MEUCCI

Advanced Risk and Portfolio Management

The Only Heavily Quantitative, Omni-Comprehensive, Intensive Buy-Side Bootcamp

August 16-21, 2010, Baruch College, 55 Lexington Avenue, New York
www.baruch.cuny.edu/arpm

What you get

- ✓ **Knowledge:** in-depth understanding of buy-side modeling from the foundations to the most advanced statistical and optimization techniques, in six intensive days of theory and MATLAB live examples and exercises
- Market modeling:** random walk, ARMA, GARCH, Levy, long memory, stochastic volatility
- Multivariate statistics:** non-parametric, non-normal MLE, shrinkage, robust, Bayesian estimation; copula/marginal factorization; location-dispersion ellipsoid
- Factor modeling:** theory and pitfalls of time-series and cross-sectional factor models, CAPM, APT, principal components analysis, random matrix theory
- Pricing:** full evaluation, Greeks, stress-matrix interpolation; analytical, Monte Carlo, historical
- Risk analysis:** diversification, stochastic dominance, expected utility, Sharpe ratio, Omega, Kappa, Sortino, value at risk, expected shortfall, coherent and spectral measures
- Advanced management:** robust/SOCP optimization, shrinkage/Bayesian allocations, Black-Litterman and beyond; transaction costs, liquidity, market impact; statistical arbitrage; convex/concave dynamic strategies, CPPI, delta-replication
- ✓ **Materials:** A. Meucci's classic *Risk and Asset Allocation*; MATLAB demos; ~500 slides
- ✓ **Certifications:** 40 CFA Institute CE credits; 3 academic credits at Baruch MFE; Advanced Risk and Portfolio Management worldwide exam & certificate
- ✓ **Meet the Stars:** guest lectures and cocktail party with the best: Bob Litterman, Peter Carr, Bruno Dupire, Fabio Mercurio

What you pay

\$850 (Academic/Student/Bloomberg); **\$1,200** (Partner); **\$1,550** (Professional)
 Special **group rates:** your whole team will be trained and tested worldwide

Audience

- ✓ **Buy-side professionals** (portfolio managers/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
- ✓ **Sell-side professionals** (traders, financial engineers, quantitative analysts, research teams) will bridge the gap to the buy-side aspects of quantitative finance
- ✓ **Academics and students** will understand the big-picture and the details of buy-side finance in a concise, quantitative language familiar to them

Attilio Meucci

Bloomberg ALPHA, Portfolio Analytics and Risk / MFE Baruch College
 Learn more at www.symmys.com

Charity

Each dollar paid will turn into a 50 cent donation to **Doctors without Borders**

Registration/Information

www.baruch.cuny.edu/arpm

Day 1 – Monday, 16 August 2010

Morning Session (8:30-12:30) Quest for Invariance	Afternoon Session I (14:00-16:00) Price Modeling
<ul style="list-style-type: none">▪ Invariance and the random walk<ul style="list-style-type: none">- Equities: log-returns- Fixed-income: changes in yield to maturity- Derivatives: (log) changes in vol. surface▪ Advanced dynamics in discrete time<ul style="list-style-type: none">- Autocorrelation and AR(1) processes- ARMA processes and Wold's theorem- Long memory: fractional integration- Volatility clustering: GARCH▪ Advanced dynamics in continuous time<ul style="list-style-type: none">- Random walk: Levy processes- Autocorrelation: Ornstein-Uhlenbeck- Long memory: fractional Brownian motion- Volatility clustering: stochastic volatility- Volatility clustering: subordination	<ul style="list-style-type: none">▪ Projection of invariants to the investment horizon<ul style="list-style-type: none">- Analytical projection: convolution- Numerical projection by FFT- Numerical projection by simulations▪ Pricing of invariants at the investment horizon<ul style="list-style-type: none">- Analytical: log-distributions- Numerical: scenario pricing (Monte Carlo/historical)- Full pricing vs Taylor approximation- Taylor approximation: theta-delta/vega-gamma- Taylor approximation: carry-duration-convexity
	Afternoon session II (16:00-18:30) Review & Exercises
	Evening session (18:30-19:15) Guest lecture by Peter Carr

Day 2 – Tuesday, 17 August 2010

Morning session (8:30-12:30) Factor Modeling I	Afternoon session I (14:00-16:00) Factor Modeling II
<ul style="list-style-type: none">▪ Multivariate dynamics<ul style="list-style-type: none">- Copula-marginal factorization- Multivariate Ornstein-Uhlenbeck process- Cointegration- Statistical arbitrage▪ Dimension reduction<ul style="list-style-type: none">- Generalized r-square- Explicit factors- Implicit factors- Statistical factors▪ Explicit factors examples<ul style="list-style-type: none">- Capital Asset Pricing Model- Arbitrage Pricing Theory- Fama-French factors▪ Statistical factors examples<ul style="list-style-type: none">- Principal component analysis of the swap market- Level-slope-butterfly interpretation of the components- Continuum limit: Fourier basis and main frequencies	<ul style="list-style-type: none">▪ Factor modeling pitfalls<ul style="list-style-type: none">- Returns vs. invariants- Estimation vs interpretation- Time-horizon beta▪ “Factors on Demand”<ul style="list-style-type: none">- Top-down vs. bottom-up factor models- Portfolio-specific factor models- Point-in-time factor models- Point-in-time style analysis- Non-Greek hedging
	Afternoon session II (16:00-18:30) Review & Exercises
	Evening session (18:30-19:15) Guest lecture by Bruno Dupire

Day 3 – Wednesday, 18 August 2010

<p>Morning session (8:30-12:30) Estimation I</p> <ul style="list-style-type: none"> ▪ Estimators <ul style="list-style-type: none"> - General definitions - Evaluation: bias, inefficiency, error - Stress-testing - Generalized p-values, generalized t-statistics ▪ Multivariate non-parametric estimators <ul style="list-style-type: none"> - Sample quantile and order statistics. - Sample mean/covariance and best-fitting ellipsoid - Sample factor loadings, betas, and OLS ▪ Multivariate maximum-likelihood estimators <ul style="list-style-type: none"> - Normal hypothesis: sample estimators - Non-normal hypothesis: fat tails and outlier rejection ▪ Shrinkage estimators <ul style="list-style-type: none"> - Stein mean - Ledoit-Wolf covariance 	<p>Afternoon session I (14:00-16:00) Estimation II</p> <ul style="list-style-type: none"> ▪ Robust estimators <ul style="list-style-type: none"> - Assessing robustness: the influence function - Huber's "M" robust estimators: location, scatter and betas - Outlier detection and high-breakdown estimators - Minimum-volume ellipsoid and minimum-covariance determinant ▪ Missing data <ul style="list-style-type: none"> - EM algorithm - ML marginalization
	<p>Afternoon session II (16:00-18:30) Review & Exercises</p>
	<p>Evening session (20:00-22:00) Cocktail party at Bloomberg L.P. with Bob Litterman</p>

Day 4 – Thursday, 19 August 2010

<p>Morning session (8:30-12:30) Risk Management I</p> <ul style="list-style-type: none"> ▪ Investor's objectives <ul style="list-style-type: none"> - Total return - Benchmark allocation - Net profits ▪ Portfolio evaluation <ul style="list-style-type: none"> - Stochastic dominance - Satisfaction indices ▪ Non-dimensional indices <ul style="list-style-type: none"> - Sharpe ratio - Omega - Sortino ratio - Kappa ▪ Expected utility and certainty-equivalent <ul style="list-style-type: none"> - Analytical solutions: mean-variance as satisfaction - Numerical solutions ▪ Diversification <ul style="list-style-type: none"> - Review of common definitions - Conditional principal portfolios - Effective number of bets 	<p>Afternoon session I (14:00-16:00) Risk Management II</p> <ul style="list-style-type: none"> ▪ Quantiles and value at risk (VaR) <ul style="list-style-type: none"> - Semi-analytical solutions in elliptical markets - Cornish-Fisher approximation - Extreme value theory (EVT) - Numerical solutions - Contribution to VaR from securities and from factors ▪ Coherent measures of performance <ul style="list-style-type: none"> - Expected shortfall (ES) and conditional value at risk (CVaR) - Contribution to ES from securities and from factors - Spectral measures of performance
	<p>Afternoon session II (16:00-18:30) Review & Exercises</p>
	<p>Evening session (18:30-19:15) Guest lecture by Fabio Mercurio</p>

Day 5 - Friday, 20 August 2010

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
- **Two-step heuristics**
 - Analytical mean-variance: two-fund theorem
 - Numerical mean-variance: quadratic programming
 - Mean-CVaR and alternative trade-offs
- **Benchmark vs. total-return portfolio management**
 - Expected outperformance, tracking error, information ratio
 - Analytical mean-variance solutions in total-return coordinates
 - Analytical mean-variance solutions in relative-return coordinates
- **Pitfalls of the mean-variance approach**

Afternoon session I (14:00-16:00) Portfolio Management II

- **Estimation risk: allocation as a decision**
 - Opportunity cost as loss of an estimator
 - Stress testing
- **Simple allocation techniques**
 - Prior allocation and high efficiency
 - Sample-based allocation: unbiasedness and leverage of estimation error
- **Dynamic allocation strategies**
 - Convex/concave strategies
 - CPPI
 - delta-replication

Afternoon session II (16:00-18:30) Review & Exercises

Day 6 - Saturday, 21 August 2010

Morning session (8:30-12:30) Portfolio Management III

- **Robust allocation**
 - Box uncertainty sets
 - Elliptical uncertainty sets (second-order cone programming)
- **Black-Litterman and enhancements**
 - Views on market parameters
 - Views on the market realizations
 - Black-Litterman for derivatives
- **Beyond Black-Litterman**
 - Non-normal markets
 - Non-linear views
 - Generalized stress-testing
 - Ranking allocation

Afternoon session I (14:00-16:00) Portfolio Management IV

- **Multivariate Bayesian estimation**
 - Theoretical background
 - Analytical solutions: Normal-Inverse Wishart model
 - Numerical solutions: Monte Carlo Markov Chains
- **Bayesian allocation**
 - Predictive return allocation
 - Classical-equivalent allocation
- **Liquidity**
 - Transaction costs
 - Market impact
 - Best execution

Afternoon session II (16:00-18:30) Review & Exercises

Certifications

Certificate in Advanced Risk and Portfolio Management

Participants who attend all classes and review sessions will become eligible to take an exam, consisting of two parts: a MATLAB project and a written test.

The MATLAB project will be assigned at the end of the bootcamp. Free MATLAB trial versions will be made available. The completed project will be submitted by e-mail by Sunday, October 3, 2010.

The written test will be offered in the nearest Bloomberg office worldwide, on Saturday, October 23, 2010, from 9am to 1pm.

Upon successful completion of the exam, participants will be awarded the "Certificate in Advanced Risk and Portfolio Management", issued by the Master in Financial Engineering Program of the Baruch College

CFA Institute Accreditation

Attilio Meucci is registered with CFA Institute as an Approved Provider of continuing education programs. This program is eligible for 40 CE credit hours as granted by CFA Institute



Academic Credits at Baruch MFE

The "Advanced Risk and Portfolio Management" bootcamp is the fundamental course on quantitative buy-side finance in the Master's in Financial Engineering program at Baruch. Students enrolled in this program will earn three academic credits toward the completion of their degree

FRM Accreditation

Attilio Meucci is registered with the Global Association of Risk Professionals (GARP) as an Approved Provider of continuing education programs

Partners