Addressing practical issues with traditional models: implementing benchmark-relative optimisation, applying Bayesian techniques, dealing with the curse of dimensionality, and resolving data problems

Exploring advanced techniques: applying portfolio resampling, implementing constrained optimisation for robust portfolio construction, optimising transaction costs and turnover constraints

Dealing with non-normality and non-standard preferences: reviewing the lower partial moments approach, including options into portfolio construction, and understanding scenario optimisation
Rationale, Objectives, and Target Audience

ON THE IMPORTANCE OF PORTFOLIO CONSTRUCTION

Portfolio construction – meaning the optimal implementation of a set of “signals” generated by strategists, asset allocators, analysts and the like – is at the centre of any modern investment process. This has not always been the case, and cynics might argue that the increased interest in risk management techniques in the asset management arena is in large part a response to the significant underperformance of many investment houses along with its unpleasant consequences, such as legal actions, compensation and/or a shift to passive management. Although that might not apply in all cases, the asset management industry as a whole is undergoing a more realistic assessment of its performance-generating skills.

Figure 1 below goes some way in explaining the asset management industry’s focus on portfolio construction. For different skill levels, it compares the outcome of naive portfolio construction (equally overweight/underweight assets with the best/worst signals) with optimal portfolio construction (optimally over/underweight assets depending on signal strength as well as risk contributions). Skill levels were measured as an information coefficient, ie, the correlation between forecast returns and actual returns. Performance was measured as the information ratio, which is the active return divided by the active risk – ie, tracking error. At realistic levels of investment skill (information coefficient of 0.05), optimal portfolio construction does make a difference, giving an information ratio about four times higher than that of the naive method. As the skill level rises (moving to the right in the graph), the gap narrows considerably, confirming the intuition that you don’t need risk management if you have good forecasts. However, investment skill has to be tripled, from 0.05 to 0.15, to arrive at the same risk-adjusted performance as optimal portfolio construction. Given that an information coefficient of 0.05 might be viewed as the level achieved by the average asset manager, the figure suggests there is good reason for the increasing focus on portfolio construction methods with a sound analytical basis.

Figure 1: Comparison of results of naive and optimal approaches to portfolio construction. Height of bars represents investment success for a given level of investment skill (skill measured as information coefficient)
PORTFOLIO CONSTRUCTION VERSUS RISK BUDGETING

Contrary to the belief of some, there is no difference between portfolio construction using various portfolio optimisation tools that attempt to trade off expected return against expected risk (return risk, estimation risk, modelling risk, etc) and risk budgeting. That is why this course has been titled “portfolio construction and risk budgeting in practice”. Investors have to trade off risk and return in an optimal way, i.e., in a way that is both in accordance with their beliefs and preferences and which also ultimately optimises their portfolios. Practitioners may be confused as the result of the optimal portfolio construction exercise is an allocation either in nominal dollar terms or in percentage weights, whereas risk budgeting does not arrive at asset weights but at risk exposures expressed in terms of value-at-risk or percentage contributions to risk.

However, if risk budgets are optimally derived, this is just a presentational difference – one that certainly has educational value but with no investment value. Hence, the biggest advantage of the risk budgeting approach is that it becomes evident to investors that even small positions can carry large risks (a 5% departure from the benchmark allocation into emerging market debt for a portfolio benchmarked against government bonds will consume most of an investor’s risk budget). The fact that portfolio optimisation reports results in terms of actual asset weights does not mean that a portfolio optimiser does not look at the risk contributions of different asset classes. Those who see risk budgeting simply as a way of enforcing diversification, and who diversify by assuming rather than deriving a solution, will fail – by over- or underdiversifying – to achieve the highest return per unit of risk and will therefore expose an investor to more risk than necessary.

OBJECTIVES

This course is devoted to bridging the gap between portfolio theory and practical portfolio construction and building viable, stable, and realistic portfolio models, taking into account the lessons from the global financial crisis. It looks at feasibility and relevance issues with traditional portfolio models, introduces techniques to make covariance matrix estimation feasible, improve parameter estimates, address data limitations, and deal with illiquid asset classes. It presents methods to implement alternative portfolio models that account for non-normality risks, estimation error and parameter uncertainty, prior knowledge, realistic risk preferences, and transaction costs. It discusses scenario optimisation and its applications.

TARGET AUDIENCE

Anyone developing, managing, or selling financial products – whether on the buy or the sell side – needs to know how his or her financial products fit into an investor’s portfolio and how much the investor might find optimal. Hence, an understanding of how a scarce risk budget is optimally allocated is essential.

The course targets primarily practitioners, including portfolio managers, consultants, strategists, marketers, and quantitative analysts. It is intended to be accessible to the mathematically interested practitioner who has a basic understanding of calculus, matrix algebra, and statistics. Some knowledge of financial economics will also prove helpful.
Seminar Instructor

Bernd Scherer is affiliate professor of finance at EDHEC Business School, having recently stepped down as full-time faculty member to become the chief investment officer of alternative asset manager FTC in Vienna. Before joining EDHEC-Risk Institute, he was a managing director and the global head of quantitative structured products at Morgan Stanley in London and honorary visiting professor at the University of London Birkbeck College. At Morgan Stanley, he was responsible for the creation of active investment strategies within commodities, foreign exchange, credit and volatility products. Previously, he was with Deutsche Asset Management, where he successively headed the Investment Solutions and Overlay Management Group in Frankfurt, and Global Quantitative Research and Portfolio Engineering from New York. During his 17-year career in asset management he also worked for Schroders Investment Management, Oppenheim Investment Management and J.P. Morgan Investment Management.

His research on investment management, asset allocation, portfolio construction, and asset pricing has been widely published in refereed academic and practitioner journals such as Financial Analysts Journal, the Journal of Alternative Investments, the Journal of Banking and Finance, the Journal of Investment Management, the Journal of Portfolio Management and Risk. He serves as associate editor for the Journal of Asset Management. He is also on the management committee of the London Quant Group.

Doctor Scherer has authored and co-authored six reference books on portfolio construction and optimisation, risk management, investment management, and liability hedging. His best selling Portfolio Construction and Risk Budgeting is now in its fourth edition.

He holds graduate degrees in economics from the University of Augsburg and the University of London and a Ph.D. in financial econometrics from the University of Giessen.

Praise for the instructor’s “Portfolio Construction and Risk Budgeting” book:

“…..shows an approach that leads to more intuitive portfolios. It is highly recommended to the professional and academic communities.”

Stefan Hartmann, Global Head of Quantitative Research
RBS Global Banking & Markets

“This book makes an important contribution to asset management and I recommend it very strongly.”

Stephen Satchell, PhD, Reader of Financial Econometrics, Trinity College, University of Cambridge. and Editor, Journal of Asset Management

“This book will appeal to a large audience because it is sophisticated without being too technical”

Glyn Holton, financial risk management author and consultant and Founder, Contingency Analysis
Content and Outline
This course aims to provide a comprehensive treatment of alternative portfolio construction techniques, ranging from traditional methods based on mean–variance and lower partial moments approaches, through Bayesian techniques, to more recent developments such as portfolio resampling and stochastic programming solutions using scenario optimisation.

Part 1: Revisiting Basic Portfolio Construction Techniques
1. Characteristic Portfolios
   • Efficient set mathematics
   • The role of characteristic portfolios
   • Cash neutrality, cash and beta neutrality
   • Risk decomposition and implied return analysis
2. Benchmark Relative Optimisation
   • Tracking error versus mean variance efficiency
   • Tracking error funding assumptions
   • Dual benchmark optimization
   • Practical issues
3. Bayesian Techniques in Portfolio Construction
   • Foundations of Bayesian Analysis
   • General multivariate case
   • In-depth exploration of the Black/Litterman approach
   • Hierarchical priors
4. Covariance Matrix Construction and Factor Models
   • The statistics of the covariance matrix
   • The inverse of the covariance matrix and its properties
   • The rationale for factor models
   • Types of factor models and their properties
5. Dealing with Data Problems
   • Missing data: imputation methods
   • Time series of different length: Bayesian methods
   • Correcting for illiquidity and spurious autocorrelation

Part 2: Exploring Advanced Portfolio Construction Techniques
1. Portfolio Bootstrapping
   • Visualising estimation error
   • Resampled efficiency
   • Pitfalls of portfolio resampling
2. Robust Portfolio Construction
   • Box constraints
   • Norm constraints and relation to regression methods
   • Relation to Bayesian methods
3. Transaction Costs and Turnover Constraints
   • Linear transaction costs, turnover constraints, optimisation
   • Optimisation with multiple accounts
   • Optimal trading algorithms
   • Optimal rebalancing
4. The Impact of Constraints on Value Added
   • 120/20 investing
   • Constraints and multiplier analysis
   • Transfer coefficient - constraints and value added
5. Risk Budgeting
   • Normal and non-normal risk decomposition
   • View optimisation
   • Diversification constraints

Part 3: Dealing with Non-Normality
1. Non-Normality and Portfolio Choice
   • When is it a problem?
   • Non-normality and estimation error
   • Early approaches to non-normality: lower partial moments
2. Scenario Optimization
   • Implied Returns and Non-Normality
   • Alternative objective functions
   • Generating scenarios: copulas, tail dependence and marginal distributions
   • Full scale optimisation
3. Portfolio Optimisation with Options
   • State price deflators
   • Martingale approach to optimisation
   • Implied distributions and optimisation
Schedule
The programme lasts for three days. The two class sessions in each half-day period are separated by thirty-minute refreshment breaks. Every day, participants will receive an assignment, containing theoretical and empirical exercises.

Registration, Fee and Funding Information
Fees
Seminar Fees are SGD 6,000, inclusive of 7% GST. Fees include instruction, teaching materials, and refreshments at breaks. Accommodation is not included.

Funding
The Monetary Authority of Singapore (MAS) administers grants to financial sector organisations that sponsor eligible participants to training programmes that meet qualifying criteria. For enquiries, please contact the MAS at +65 6229 9396 or via email at fsdf@mas.gov.sg.

Billing and payment
The fee is billed following registration and must be settled before the seminar begins. Payment can be made by wire transfer or cheque drawn on a Singapore bank.

Transfer or cancellation
Transfer of registration to a colleague, upon written notice, is allowed and free of charge. Transfer of registration fees to another EDHEC-Risk Institute programme must be requested in writing and is subject to the following charges: 45 to 30 days’ notice: 15% of the fee; 29 to 11 days’ notice: 30% of the fee; 10 days’ notice or less: 50% of the fee. Cancellations of confirmed seats must be received in writing and are subject to the following charges: 45 to 30 days’ notice: 25% of the fee; 29 to 11 days’ notice: 50% of the fee; 10 days’ notice or less: 100% of the fee.

Further Information and Registration
Email: karen.teo@edhec-risk.com
Phone: Karen Teo +65 6438 0030

EDHEC-Risk Institute
393 promenade des Anglais
BP 3116
06202 Nice Cedex 3
France
Tel: +33 (0)4 93 18 78 24

EDHEC Risk Institute—Europe
10 Fleet Place
Ludgate
London EC4M 7RB
United Kingdom
Tel: +44 208 150 8370

EDHEC Risk Institute—Asia
1 George Street
#07-02
Singapore 049145
Tel: +65 6438 0030

EDHEC Risk Institute—Asia
Singapore Council for Private Education registration No.201025256Z from 22-06-2011 to 21-06-2017

EDHEC-Risk Institute
Established in 2001, EDHEC-Risk Institute has become the premier European centre for financial research and its applications to the investment industry.

In partnership with large financial institutions, its team of 90 permanent professors, engineers and support staff implements six research programmes and fourteen research chairs and major research projects focusing on asset allocation and risk management in the traditional and alternative investment universes. Research results are disseminated through the three EDHEC-Risk Institute locations in London, Nice and Singapore.

EDHEC-Risk Institute validates the academic quality of its output through publications in leading scholarly journals, implements a multifaceted communications policy to inform investors and asset managers on state-of-the-art concepts and techniques, and forms business partnerships to launch innovative products. Its executive education arm helps professionals to upgrade their skills with advanced risk and investment management seminars and degree courses, including the EDHEC-Risk Institute PhD in Finance.