EAA Web Session
Risk Aggregation and Capital Allocation:
From Calibration to Application and Beyond

27 October 2025 | 10:00-12:00 CET | online

Introduction

Risk diversification is at the heart of insurance. In a modern Enterprise Risk Management (ERM) approach, a company's entire risk profile - including risk diversification and concentration - must be considered in decision-making processes such as insurance pricing, product design, asset allocation and reinsurance. The impact on risk-oriented performance measures such as return on risk-adjusted capital (RORAC) and economic value added (EVA) must also be assessed.

This web session focuses on the aggregation of individual risks to the overall level of an insurance company. To achieve this, we apply both deterministic and stochastic copula-based approaches, along with key risk measures such as Value-at-Risk (VaR) and Expected Shortfall (ES). The outcome of this process is the capital requirement, which must be covered by the company's own funds—a limited and costly resource that necessitates careful management.

Against this backdrop, we explore risk steering methods that support economically sound decision-making, addressing key questions such as:

- How can we impose effective risk limits for business segments?
- How can we identify value-enhancing and value-reducing business segments in the context of the firm's overall risk profile?
- How can we make informed decisions on risk mitigation tools?
- How can we incorporate the cost of capital into insurance pricing?

A fundamental concept underlying all these questions is capital allocation, and specifically the gradient (Euler) capital allocation principle. The principle is directly linked to "marginal capital requirements" and is compatible with the performance measures mentioned above.

However, the proper implementation of capital allocation in risk management, risk limiting, and decision making often imposes significant challenges. On the computational side, the gradient allocation principle requires determining the derivative of the risk measure—typically Value-at-Risk or Expected Shortfall—with respect to business volumes or other decision variables. Obtaining these derivatives is numerically challenging, especially when risk measurement relies on Monte Carlo simulations. We demonstrate methods to enhance the stability of these estimations, such as kernel estimation. In addition, the allocation has the limitation of accounting only for the risk diversification effects of the current portfolio, which can easily become invalid if the portfolio changes and new risk concentration and diversification patterns

emerge. To tackle this issue, we present a recently developed methodology called "Orthogonal Convexity Scenarios" (OCS), which helps to proactively identify potentially adverse portfolio shifts and integrate them into risk management and business steering.

Participants

This web session is particularly intended for actuaries involved in enterprise risk management, risk communication, insurance pricing, business support or strategic decision making.
As we will be diving into the an explicit case study implemented in R, you should bring a basic knowledge of the R programming language (https://www.r-project.org/) and R Studio.

Purpose and Nature

Participants will gain an in-depth understanding of two techniques for allocating aggregate capital to business units or individual risks that are valuable for risk assessment and business management.

Using R, we provide a practical case study on the (often challenging) estimation of gradient capital allocation and Orthogonal Convexity Scenarios using kernel estimation methods, providing in-depth guidance on how to apply the two methods in practice.

Language

The language of the web session will be English.

Lecturers

Dr Philipp Aigner
Philipp holds a degree in mathematics and works as a consultant specializing in risk management in the insurance industry for zeb.rsa GmbH. His doctorate, completed in 2023 at Johannes Gutenberg University Mainz, focused on capital allocation methods and their application to practical issues.
For his research, he was awarded the GAUSS Young Talent Award 2023 by the German Society for Insurance and Financial Mathematics (DGVFM) and the German Association of Actuaries (DAV).

Prof Dr Sebastian Schlütter
Sebastian studied business mathematics at the University of Ulm and holds a doctorate in business administration from the Goethe University Frankfurt, where he is a fellow at the International Center for Insurance Regulation (ICIR). He is a certified actuary of the German Association of Actuaries and has been working on Solvency II and Enterprise Risk Management for five years, partly in consulting and partly in the insurance industry. Since 2015, he is Professor of Quantitative Methods at the School of Business of Mainz University of Applied Sciences.

Preliminary Programme

Monday, 27 October 2025
10:00-12:00   Topics
- Overview about risk aggregation and capital allocation in light of an example and applications
- Estimation of the gradient capital allocation
- Case study in R
- Concept of Orthogonal Convexity Scenarios (OCS)

All the above times are given in CET (Central European Time).

Fees & Registration

Early Bird Registration Fee (until 15 September 2025):
- For private customers in the EU: €150.00 + VAT of the billing country (example Germany: €178.50 incl. 19% VAT)
- For private customers outside the EU: €178.50 (incl. 19% VAT)
- For businesses within the EU (excl. Germany, with valid VAT ID): €150.00 (net, reverse charge applies)
- For businesses in Germany: €178.50 (incl. 19% VAT)

Regular Registration Fee (from 16 September 2025):
- For private customers in the EU: €195.00 + VAT of the billing country (example Germany: €232.05 incl. 19% VAT)
- For private customers outside the EU: €232.05 (incl. 19% VAT)
- For businesses within the EU (excl. Germany, with valid VAT ID): €195.00 (net, reverse charge applies)
- For businesses in Germany: €232.05 (incl. 19% VAT)

Important VAT Information:
- For private customers with a billing address in an EU country: VAT will be charged at the applicable rate in the country of the billing address. The final amount, including VAT, will be calculated upon invoicing.
- For customers with a non-EU (third country) billing address: Only a non-company billing address is accepted for VAT compliance reasons. 19% VAT applies to all non-EU private customers.
- For businesses within the EU (excluding Germany), Iceland, Liechtenstein, Norway, Switzerland, and the UK with a valid VAT ID: The reverse charge mechanism applies (net price; VAT will not be charged). Please ensure your valid VAT ID is entered correctly during registration.
- For all customers with a billing address in Germany: 19% VAT applies.

Please submit your registration using this online form. Closer to the event, you will receive further login details to join the web session.

Your registration is binding. Cancellation is only possible up to 2 weeks before the first day of the event. If you cancel later, the full participation fee is due. You may appoint someone to take your place but must notify us in advance. EAA has the right to cancel the event if the minimum number of participants is not reached.

We will send you an invoice via email. Please allow a few days for handling. Please always give your invoice number when you effect payment. All bank charges are to be borne by the participant.

Registration is open until two working days before the web session. If registration has already been closed for this web session, please call us or send an email to contact@actuarial-academy.com in order to find out whether a late registration is still possible.

Technical Requirements

Please check with your IT department if your firewall and computer settings support web session participation (the programme Zoom will be used for this online training). Please also make sure to join the web session with a stable internet connection. Both R and R Studio need to be installed prior to attending the web session in order to participate effectively in the case study.

CPD

For this web session, the following CPD credits are available under the CPD scheme of the relevant national actuarial association:

Austria:	2 points
Belgium:	2 points
Bulgaria:	individual accreditation
Croatia:	individual accreditation
Czechia:	2 hours
Denmark	2 credits
Estonia:	2 hours
Finland:	2 points
France:	12 points
Germany:	2 hours
Greece:	3 points
Hungary:	2 hours
Iceland:	2 credits
Ireland:	2 hours
Italy:	GdLA individual accreditation
Latvia:	2 hours
Lithuania:	2 hours
Netherlands:	approx. 2 points (individual accreditation)
Norway:	2 points

Poland:	2 hours
Portugal:	2 hours
Serbia:	2 hours
Slovakia:	individual accreditation
Slovenia:	individual accreditation
Spain:	CAC: 2 hours, IAE: 2 hours
Switzerland:	individual accreditation
USA:	SOA (Section B): up to 2.4 hours

No responsibility is taken for the accuracy of this information.