

EAA Seminar  
**Advanced Non-Life Pricing & Profitability:  
Machine Learning Techniques with R**

11/12 March 2019 | Athens, Greece



Organised by the EAA - European Actuarial Academy GmbH in cooperation with the Hellenic Actuarial Society.

### Introduction

Non-Life insurance is facing many challenges ranging from fierce competition on the market or evolution in the distribution channel used by the consumers to evolution of the regulatory environment.

Pricing is the central link between solvency, profitability and market shares (volume).

Improving pricing practice encompasses several dimensions:

- Technical: is our pricing adequate to cover the underlying cost of risk of my policyholders and the other costs we are facing? Which are the key variables driving the risk? Are they adequately taken into account in our pricing? What's the impact of the claims history of my policyholder on its expected risk? In which segment are we profitable and in which are we not profitable?
- Competition: at what price will we attract the segments that we target and price out those that we do not want? Is the positioning of our competitors influencing our pricing practice and our profitability? What's my position with respect to my competitors in term of pricing? What are the segments in which I am well positioned and the segments where I am not well positioned?
- Elasticity: what price (evolution) are our existing customers prepared to accept? Does the sensitivity to price evolution depend on the profile of my customer?
- Segmentation: is our segmentation granular enough for our purposes?

The aim of this seminar is to present some advanced actuarial/statistical techniques used in non-life pricing, competition analysis and profitability analysis. The seminar focuses on some practical problems faced by pricing actuaries and product managers and presents some new techniques used in non-life pricing in order to open new perspectives for product development (competition analysis, profitability analysis,...).

## Participants

The seminar is developed for non-life actuaries or statisticians but also for managers working in product development or risk management departments. It is designed as a follow-up workshop to the EAA seminars "Introduction to Non-Life Pricing" held in the years 2013-2018. Participation to this introductory seminar is not a prerequisite but participants should have basic knowledge of non-life pricing (especially of Generalized Linear Models) to participate to this advanced seminar. A short introduction will be performed to recall the key messages of the introductory seminar.

Attendees are encouraged to bring a laptop computer with R installed as well as some useful packages (all the information will be provided after subscription). A basic knowledge of the R software is useful.

## Purpose and Nature

The seminar will alternate between methodological concepts, practical examples and case studies in order to ensure a comprehensive understanding of the techniques presented.

The case studies will be performed by the participants with the R software.

## Language

The language of the seminar will be English.

## Lecturers

### Samuel Mahy (Reacfin)

Samuel graduated as a Civil Engineer in Applied Mathematics with an additional minor in Economy and holds a Master in Actuarial Sciences, as well. He is a qualified actuary of the Institute of Actuaries in Belgium (IA|BE) and involved in the Reinsurance and Non-Life Workgroup of the IA|BE. He is the Head of the Non-Life Center of Excellence at Reacfin. Samuel has been active 5 years in the reinsurance sector where he was involved in reinsurance pricing model developments. At the same time he was also the main responsible of the UK market portfolio profitability follow-up. Samuel joined Reacfin in June 2010 as a specialist in Non-Life Insurance and Reinsurance and he has acquired a sound knowledge of Solvency 2 frameworks (Non-Life, Health). As a director, he is involved in various missions as in the modelling, implementation and validation of pillar I deliverables (standard approach

and (Partial) Internal models), reinsurance optimization, model documentation, non-life pricing model development for several lines of business, etc..

### Xavier Maréchal (Reacfin)

Xavier is founder and CEO of Reacfin. Xavier is one of the co-authors of “Actuarial Modeling of Claim Counts: Risk Classification, Credibility and Bonus-Malus Systems” (Wiley, 2007). Xavier has obtained different academic degrees as Civil Engineer in Applied Mathematics and MSc. Actuarial Sciences and MSc. Management. Xavier is a qualified actuary of the Institute of Actuaries in Belgium (IA|BE). Xavier has extensive experience in the actuarial field obtained during his 14 years as a principal consultant for many national and multinational insurance companies. He has gained a complementary experience in various fields going from Non-Life ratemaking and provisioning to life modeling and ALM. After several years of intensive modeling activities in life, non-life and ALM, Xavier works now as reviewer and mentor for consultants. He performed several validation assignments and holds the actuarial function for two health insurance companies.

## **Preliminary Programme**

### Monday, 11 March 2019

08.45 – 09.00	Registration
09.00 – 09.15	Introduction & welcome (EAA)
09.15 – 10.00	GLM and GAM model reminders (GLM and GAM model for frequency and Severity including continuous variables)
10.00 – 10.30	Penalized regression techniques (Lasso, Ridge, interaction detection,...): methodology and examples
10.30 – 10.45	Coffee Break
10.45 – 12.30	Data Pre-Analysis and Feature Selection (data quality, pre-treatment, missing values and feature selection) Case Study part 1 (Data analysis and features selection with random forest) Case Study part 2 (A first technical tariff: GLM/GAM model adjustment and backward regression)
12.30 – 13.30:	Lunch
13.30 – 14.45	Introduction to machine learning algorithms (regression trees, random forest, boosting, ...)
14.45 – 15.00	Coffee Break
15.00 – 17.00:	case studies Case Study part 3 (Application of GBM method to highlight interactions) Case Study part 4 (Continuous Variables categorization using regression trees or clustering methods)

## Tuesday, 12 March 2019

09.00 – 10.30	Experience rating: how to adapt individual premium with past claims history? Credibility models and Bonus-Malus Systems
10.30 – 10.45	Coffee Break
10.45 – 12.15	Case studies Case Study part 5 (experience rating to assess broker quality) Case Study part 6 (broker categorization with clustering methods)
12.15 – 13.15:	Lunch
13.15 – 15.10	Profitability and Competition analysis (profitability and positioning assessment, reverse engineering of competitors prices) Case Study part 7 (profitability analysis with regression trees)
15.10 - 15.15	Concluding remarks, closing of seminar (EAA)

## **Fees & Registration**

Please register for the seminar as soon as possible because of the expected demand. If there are more persons interested in this seminar than places available we will give priority to the registrations received first. Please send your registration as soon as possible by using our online registration form at [www.actuarial-academy.com](http://www.actuarial-academy.com).

Your registration is binding. Cancellation is only possible up to 4 weeks before the first day of seminar. If you cancel later, the full seminar 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.

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

Your early-bird registration fee is € 790.00 plus 24 % VAT until 21 January 2019. After this date the fee will be € 970.00 plus 24 % VAT.

## **Venue & Accommodation**

The seminar will take place in Athens, Greece:

Electra Palace Hotel Athens

18-20, N. Nokodimou str

10557 Athens, Greece

Phone: +30 210 3370000

[www.electrahotels.gr](http://www.electrahotels.gr)

We have arranged special prices for accommodation. The special rate is 145 € per night in a classic single room including breakfast and VAT. It is valid for bookings before 18 February 2019 out of our allotment "EAA Seminar". Our allotment includes a limited number of rooms. Kindly book your accommodation directly with the hotel using this booking form and note the hotel's cancellation policy.

## CPD

For this seminar, the following CPD points are available under the CPD scheme of the relevant national actuarial association:

Austria:	11 points
Belgium:	11 points
Bulgaria:	12 points
Czech Republic:	2-3 points (individual accreditation)
Estonia:	11 hours
Finland:	7.75 points
Germany:	12 hours
Hungary:	12 hours
Ireland	11.5 hours
Italy: approx.	4 credits (GdLA individual accreditation)
Latvia:	12 hours
Netherlands:	approx. 11 PE-points (individual accreditation)
Portugal:	11.5 hours
Russia:	40 points
Slovakia:	8 CPD points
Slovenia:	50 points
Spain (CAC):	12 points
Spain (IAE):	11 hours
Switzerland:	15 points

No responsibility is taken for the accuracy of this information.