Title

Simpson's Paradox and Causality in Actuarial Work: Lessons Learned from Pricing, Reserving, and Capital Modeling

Speaker/Company

Giacomo Maugeri, EY-Parthenon

Abstract

Simpson's paradox is one of the most discussed problems in data science when modeling with aggregated data, but it is virtually absent in most actuarial discussion and 80% of actuaries* are not even aware of its existance! We all know that correlation does not imply causation, but how can we express causation in mathematical terms? And how would this help us explain the challenges of working with aggregated data? This short talk aims to trace the origin of Simpson's paradox, and its persistance in many actuarial areas, including Pricing, Reserving and Capital modelling, as well as the fundamental concepts of Confounding and Collapsability from Causal Inference that allow us to have a mathematical lexicon to describe and solve the paradox.

Have you ever been puzzled when the same analysis on data at different levels of aggregation leads you to different conclusions? Then this talk could be of interest to you.

*number estimated from a recent presentation on the topic to a worldwide diverse audience of ~200 actuaries

Biography

Giacomo Maugeri is a UK qualified actuary with a vast array of experiences in non-life pricing and risk managment, in particular focusing on predictive modeling, optimisation and stochastic modeling. His expertise covers personal lines and reinsurance pricing as well as capital modelling in Eruope and Middle East, championing open-source tools and data science techniques, with a specific focus on turning complex models into meaningful business propositions. He currently leads the actuarial function of EY Malta, and is an active member of the EY eMEIA actuarial EMEIA organisation focsusing on service innovation, actuarial technology and GenAI. Before joining EY he has worked as a product owner for an actuarial software house and as a data scientist in a pricing team for a UK insurer. As a volunteer for the IFoA Programming for Actuarial Work, Giacomohas contributed to the first programming guide published by the IFoA in 2020.