Advancing Non-Life Insurance Risk Modelling with NetSimR

An Open-Source Toolkit for Actuarial Analysis

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Presentation Agenda

- Profile

- Motivation

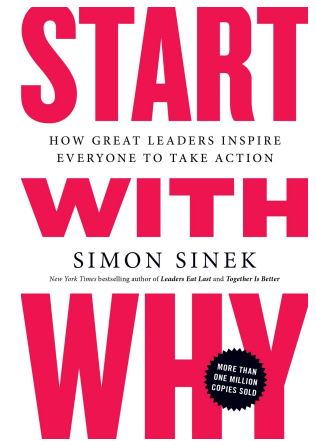- NetSimR decoded

- NetSimR demo

- Q & A

My profile

- Non-Life Pricing Actuary and Data Scientist
  > decade experience in the UK EU and Middle East

- Chartered Actuary | Chartered Insurer | MBA

- Immediate past Editor of The Actuary magazine
  >20 articles published

- IFoA Assistant Examiner 5+ years

Motivation

- **Passionate about** non-life insurance modelling & data science

- **Passionate about** contributing back to the profession

- **Passionate about** automating processes

- Passionate about sharing R&D findings

- Free for all article ([link](#)) - benefits of open source contributions

NetSimR Decoded (1) - Introduction

- Open source R library published in CRAN ([link](#))

- \> 100k downloads ([link](#))

- Functions to support non-life actuarial modelling

- 3 Shiny tools and numerous functions

- *> install.packages("NetSimR")*

NetSimR Decoded (2) - Functions

- For Lognormal, Pareto, Gamma, Sliced Lognormal-Pareto, Sliced Gamma-Pareto
  - Capped mean ([article](#))
  - Exposure curve factors
  - ILF curve factors

- Frequency/Severity Simulation function applying reinsurance structures

- Pure IBNR implementation with Gamma/Lognormal reporting delay ([article](#))

NetSimR Decoded (3) - Shiny tools

- **Distribution Fitting tool:**
  Fit frequency, severity, sliced or piecewise pareto distributions
  > NetSimR::run_shiny_distribution_fitting_tool()

- **GLM fitting tool:**
  Connect to sources, fit, visualise and export models/predictions
  > NetSimR::run_shiny_glm_fitting_tool()

- **Claim simulator:**
  Simulate frequency-severity applying reinsurance structures
  > NetSimR::run_shiny_simulator()

Shiny tool Demo (1) - Modeling claims

- Upload - Preview data

- Frequency distributions
  (Poisson/Negative Binomial)

- Severity distributions
  (e.g. LogNormal, Gamma, Pareto)

- Sliced Severity distributions
  (LogNormal with one or two Pareto Slices)

- Piecewise Pareto Slices

Shiny tool Demo (2) - Simulating claims

- Frequency: Poisson/Negative Binomial etc

- Severity: LogNormal, Gamma, Pareto etc

- Allows further Pareto slices

- Allows Each and every loss with reinstatements

- Allows Aggregate loss

Q & A