

# Methods for estimating premium risk for Solvency purposes

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## Abstract

For an operating non-life insurer, premium risk is a key driver of uncertainty both from an operational and solvency perspective. Traditionally, the day-to-day operations of a non-life insurance company focus mainly on estimating the expected average outcomes both within pricing and reserving. In the new European solvency regulation Solvency II own stochastic models (Internal Models) for estimating the Solvency Capital Requirement (SCR) are allowed, subject to supervisory approval. Following the change in regulation, models for assessing the uncertainty and not only the expected value in insurance operations are gaining increasing interest within research and also among practitioner working with assessing the uncertainty for solvency purposes.

In regards of the solvency perspective of premium risk, a lot of different methods exist aimed to give a correct view on the capital needed to meet adverse tail outcomes related to premium risks. This thesis is a review of some of these models, with the aim to understand the assumptions and their impact, the practical aspects of the parameter estimation as such and possible extensions of the methods. In particular, the issue of limited time versus ultimate parameter estimation is given special attention.

A general conclusion is that it is preferable to use methods which explicitly model the claim outcomes in terms of underlying frequency and severity distributions. The clear benefit is that these methods provide more insight in the resulting volatility than a method that directly measures uncertainty on the financial results. In regards of the time perspective, the conclusion is that going from ultimate uncertainty to limited time uncertainty can be achieved by two main methods: using transformation methods based on reserving principles to transform ultimate estimates or by the use of data observed at the appropriate point in time.

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