ABSTRACT

Starting in 2023 a new International Financial Reporting Standard (IFRS) for insurance contracts will be in force. Insurance companies reporting in IFRS will need to adapt in order to apply this new standard. In Portugal, all insurance companies will have to report their financial statements in accordance with IFRS 17.

This new standard demands that when determining the insurance contract liability, normally the largest item of a liability side of an insurance company’s balance sheet, a measure for non-financial risk has to be included, the so-called risk adjustment. The risk adjustment will represent the compensation an entity requires for bearing the uncertainty in the amount and timing of the cash flows associated with the contracts.

In different already applicable frameworks, the determination of the insurance contract liability has a specific allowance for risk, a margin above the best estimate. However, the criteria and the definition of this risk adjustment is slightly different. The standard is principles-based and therefore it does not prescribe specific methods on how to determine the risk adjustment. Regardless of the method chosen by insurance companies to determine their risk adjustment, the disclosure of the confidence level is mandatory.

This dissertation presents a model that can be applied by non-life insurance companies to determine their risk adjustment for a defined confidence level, or to estimate the confidence level associated with a pre-selected risk adjustment.

Prior to the Solvency II regime, insurance companies in Norway had to report their liabilities (determine their reserves) based on a risk theoretical model proposed by Norberg and Sundt and further developed and implemented by Kristiansen. The security provision calibrated using this model had a similar concept to the risk adjustment. Starting from this model, we adapt and extend it in order to determine a risk adjustment compliant with the characteristics imposed in the IFRS 17 standard. The method presented below relies on the NP-approximation to determine a confidence level for the present value of future cash flows determined for a group of insurance contracts.

Chapter 2 gives a review of the literature covering the determination of the risk adjustment under IFRS 17 and other similar measures under different frameworks.

Chapter 3 covers the definition and characteristics of the risk adjustment under IFRS 17. It also mentions previous frameworks in which a similar measure had to / has to be determined.

Chapter 4 focuses on the model itself. The NP-approximation is presented and the notation and assumptions going forward are defined. Based on these assumptions, we get the general expressions for the central second and third order moments of the reported but not incurred (RBNS), incurred but not reported (IBNR) and covered but not incurred claims (CBNI), which is all the information needed to estimate the risk adjustment.

The model is first presented assuming a compound Poisson process for the claim payment process. A specific section is dedicated to parameter estimation. The assumption is then generalised so that different claim payment distributions can be used. We show as other specific cases the multinomial and the Dirichlet distributions.

A short remark on the order of presentation of the models. We started this work with the intention of adapting the model of Kristiansen. We then realised that Kristiansen's original model is too limited for our purpose, as it does not include the stochastic payment process of reported claims (Kristiansen assumes that claims are fully paid, thus known, when they are reported). The compound Poisson model is a first and easy approach to the claim payment process, that we use to motivate the structure of our overall model. However, it is not the only possible model of the claim payment process. When analysing alternative models of the claim payment process – the multinomial and the Dirichlet – we discovered the general structure. We believe that our presentation, in going from a specific model to a generalised model, and thence back to other possible specifications, gives better insight into the model framework, than if we had postulated an abstract, generalised model upfront.

Chapter 5 presents the application of the model in Chapter 4 to a real non-life insurance portfolio. We have programmed the model in R and present the structure defined. The results are presented and discussed.