Modelling and calibration for non-life underwriting risk: from empirical data to risk capital evaluation

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Solvency II will introduce economic risk-based solvency requirements for insurance companies across all European Member States for the first time. These new solvency requirements will be more risk-sensitive than in the past, thus enabling a better coverage of the real risks run by any particular insurer. Consistent methodologies are necessary to describe both single source of risk and the aggregation between them. Focusing on Non-Life insurers, first results emphasize that technical risk has the greatest impact on the capital requirement. At this regard the main target of this paper is to analyse the risk profile of a multi-line non-life insurer. A risk theoretical simulation model is then applied with the aim to estimate risk capital regarding non-life underwriting risk. A collective risk model is here used to model premium risk paying special attention to the severity distributional assumptions. Mixture and combined distributions will be analyzed in order to describe both attritional and large claims. Different methodologies will be compared with the aim to model aggregate claim amount. Moreover, a comparison has been performed between Risk Based Capital, obtained by the application of an Internal Risk Model, and the equivalent Solvency Capital Requirement, as provided by the Solvency II standard formula. It is further discussed the dependence problem in order to aggregate losses from different lines of business by different approaches.

Keywords: Capital Requirement, Solvency II, Non-Life Underwriting Risk, Claims distribution, Aggregation and dependency, Internal Model.