

Internal Model Approach for Risk Management II

Vincenzo Russo

Generali Group

vincenzo.russo@generali.com

In the context of risk management needs in the insurance industry, mathematical and statistical methods are widely used to evaluate, measure and manage risks that may arise from the insurance business.

In particular, since Solvency II regulation entered in force in 2016 across the European Union, insurance companies have been entitled to develop and implement proprietary Internal Models for the evaluation and monitoring of their risk profile. Such Internal Models are prescribed by the regulation to produce in output the full multivariate statistical distribution of the losses that a company or group might experience over a 1-year time horizon, across all risks and all types of business.

The development of an Internal Model represents several methodological and computational challenges, and the specific methodological and technical aspects that characterize the design of the Generali Internal Model will be presented, stressing also the ability to take business decisions from the selected approach.

The modelling starts from an appropriate identification and representation of the main risks affecting the assets and liabilities. These risk factors need to be described by means of standalone theoretical or empirical distributions, and the dependency structure that delineates their mutual interactions has then to be established and modelled, typically by using a Copula approach. Finally, the functional relationship between the risk factors and the movement of the values of assets and liabilities detained by the company needs is determined in order to derive the correspondent distribution of the potential losses of the Own Fund.

The model heavily relies on numerical procedures, like Monte Carlo simulations, that have been implemented at many levels to address the lack of closed-form solutions for most of the quantities that need to be evaluated. The techniques applied to overcome the computational challenges underlying these numerical methods will be described, focusing on the procedures adopted to ensure their computational efficiency, numerical stability and robust convergence.