Deterministic Shock vs. Stochastic Value-at-Risk – An Analysis of the Solvency II Standard Model Approach to Longevity Risk

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Abstract

In principle, the capital requirement under Solvency II is determined as the 99.5% Value-at-Risk of the Available Capital. In the standard model's longevity risk module, this Value-at-Risk is approximated by the change in Net Asset Value due to a longevity shock, i.e. a 25% reduction of mortality rates.

We analyze the adequacy of this shock by comparing the resulting capital requirement to the Value-at-Risk based on a stochastic mortality model. This comparison reveals structural shortcomings of the 25% shock and therefore, we propose a modified longevity shock for the Solvency II standard model. We also discuss the performance of different risk margin approximations, comment on the choice of the cost of capital rate and explain how prices for longevity derivatives might relate to solvency requirements.