

The biometric risk in internal models for Solvency II

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International Actuarial Association – Life Section Colloquium – Munich 2009

Scientific Theme: Solvency, accounting and the evaluation of life insurance business

Keywords: biometric risk, internal model, Solvency II, QIS4, stress test, portfolio volatility, capital requirements

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Paper submission

For the fourth Quantitative Impact Study (QIS4), European Life insurance undertakings were asked to evaluate capital requirement for Life underwriting risk. Capital requirements were calculated according to defined stress tests, including for biometric risks. Catastrophe and disability scenarios are described in QIS4 technical specifications, and for mortality/longevity a permanent 10% increase/25% decrease in mortality rates for each age has to be considered.

We can ask ourselves the meaning of these stress tests. A 10% increase in mortality for a country like France is an increase of about 52 thousand deaths a year. What kind of event could bring such an increase of mortality? If we look back to 2003, the heat wave in that summer brought an increase in mortality of about 20 thousand deaths at the national level. The population impacted was in the vast majority elderly people, outside the main age range for (non-annuity) life assurances. For longevity, similar considerations contribute to the transparency of the stress scenarios.

We will then discuss a different perspective that improves the understanding of the underlying risk. What do the general stress scenarios of QIS4 mean for a real portfolio of life insurance contracts? To answer this question, we investigate the portfolio volatility that determines the risk of hitting the stress scenarios.

It is useful to understand when developing an internal model what are the reasons which could bring high volatility to the portfolio. Each company has its own portfolio and an internal model helps assessing the risks. A good understanding of the characteristics of each individual portfolio is a key to define the events which are the most penalizing the company. We will go deeper into the size of the portfolio and the analysis of the population pyramid of the portfolio which may induce various sensitivities to external phenomena. We will not only work on qualitative assessment but also show some quantitative results.

Finally, we will estimate the size of the biometric risk for a life undertaking according to the different types of product sold and look how we can reduce the capital requirements by optimizing the portfolio structure.