

Solvency appraisal for life annuities: demographic risk measures

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The demographic risk is the risk due to the uncertainty in the demographic scenario assumptions by which life insurance products are designed and valued. The uncertainty lies both in accidental (insurance risk) and systematic (longevity risk) deviations of the number of deaths from the value anticipated for it. This last component gives rise to the risk due to the randomness in the choice of the survival models for valuations (model risk or projection risk). If the insurance risk component can be assumed negligible for well-diversified portfolios, longevity risk is crucial in actuarial valuations.

The paper focuses in particular the solvency appraisal for a portfolio of life annuities, deepening the impact of the demographic risk according to suitable risk indexes apt to describe its evolution in time. The financial quantity proposed for representing the economic wealth of the life insurance company is the stochastic surplus and the paper analyzes the impact on it of different demographic assumptions by means of risk indicators as the projection risk index, the quantile surplus and the ruin probability.

The longevity risk is mainly taken into account in a stochastic scenario for the financial risk component.

Numerical applications clarify the practical meaning of the models in the solvency context.

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