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On systematic mortality risk and risk-minimization with survivor swaps

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Abstract

A new market for so-called mortality derivatives is now appearing with survivor swaps (also called mortality swaps), longevity bonds and other specialized solutions. The development of these new financial instruments is triggered by the increased focus on the systematic mortality risk inherent in life insurance contracts, and their main focus is thus to allow the life insurance companies to hedge their systematic mortality risk. At the same time, this new class of financial contract is interesting from an investor's point of view, since it increases the possibility for an investor to diversify the investment portfolio. The systematic mortality risk stems from the uncertainty related to the future development of the mortality intensities. Mathematically, this uncertainty is described by modeling the underlying mortality intensities via stochastic processes. We consider two different portfolios of insured lives, where the underlying mortality intensities are correlated, and study the combined financial and mortality risk inherent in a portfolio of

general life insurance contracts. In order to hedge this risk, we allow for investments in survivor swaps and derive risk-minimizing strategies in markets where such contracts are available. The strategies are evaluated numerically.

Keywords:

Stochastic mortality | Affine mortality structure | Risk-minimization | Survivor swap