

Model-Independent Price Bounds for the Swiss Re Mortality Bond 2003

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Abstract : In this paper, we are concerned with the valuation of the first Catastrophic Mortality Bond that was launched in the market namely the Swiss Re Mortality Bond 2003. This bond encapsulates the behavior of a well-defined mortality index to generate payoffs for the bondholders. Pricing this bond is a challenging task. We adapt the payoff of the terminal principal of the bond in terms of the payoff of an Asian put option and present an approach to derive model-independent bounds exploiting comonotonic theory. We invoke Jensen's inequality for the computation of lower bounds and employ Lagrange optimization technique to achieve the upper bound. The success of these bounds is based on the availability of compatible European mortality options in the market. We carry out Monte Carlo simulations to estimate the bond price and illustrate the strength of these bounds across a variety of models. The fact that our bounds are model-independent is a crucial breakthrough in the pricing of catastrophic mortality bonds.

Keywords : mortality bond, Swiss Re Bond, mortality index, comonotonicity

Conference Title : ICAFM 2016 : International Conference on Actuarial and Financial Mathematics

Conference Location : Sydney, Australia

Conference Dates : December 15-16, 2016