

## **Living with Ambiguity: Pricing Mortality-linked Securities with Smooth Ambiguity Preferences**

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### **Abstract**

Mortality is a stochastic process: it is improving in an unpredictable way. We have imprecise knowledge about the probability distribution of future mortality rates. Mortality/longevity risk, therefore, can be defined in a broader term of ambiguity. In this paper, we investigate the effects of ambiguity and ambiguity aversion on mortality-linked security pricing. We employ the two-factor mortality model proposed by Carins et al. (2006) for mortality fitting and forecasting and acknowledge ambiguity may arise from parameter uncertainty because of a finite sample data and inaccurate old-age mortality rates. We compare mortality-linked security pricing in three scenarios: (1) without parameter uncertainty, (2) with parameter uncertainty and using the standard, ambiguity-neutral Bayesian analysis, and (3) with parameter uncertainty and assuming a particular ambiguity smooth preference. We use the indifference pricing approach to derive a price range where the lower bound is the minimal price required by the seller and the upper bound is the maximum price acceptable for the buyer. We further employ an economic pricing method to compute the equilibrium price of mortality-linked securities that clears the market.

**Keywords:** Ambiguity, Ambiguity Aversion, Mortality-linked Securities