

Modeling and Pricing Longevity Risk: Permanent Jump Effects and Extreme Value Approach

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Abstract: The purpose of this study is to analyze securitization of longevity risk with an emphasis on the longevity risk modeling and longevity payoff pricing. Till now, various longevity derivatives have been proposed and the capital market experienced one unsuccessful attempt of the EIB longevity bond in 2004. After carefully analyzing the pros and cons of previous securitizations, we present our hypothetical longevity bond with the payoffs as put option spreads. We nicely integrate the parametric model with permanent jump effects and the extreme value theory for mortality fitting and forecasting. Our method is apparently new in longevity risk securitization and has the advantages of both capturing the mortality improvements within sample and extrapolating the out of sample, rare longevity events. We value the payoffs of the longevity bond via the Wang transform in an incomplete market, and illustrate the effects of extreme value approach on the accuracy of security valuation.