

Mortality Compression and Longevity Risk

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ABSTRACT

Mortality improvements, especially of the elderly, have been a common phenomenon in many countries since World War II and many believe that the life expectancy would further extend. As a result, longevity risk becomes essential in designing annuity products, and over-estimating the mortality rates may result in financial insolvency. Among all solutions for dealing with this risk, the stochastic mortality models perhaps are the popular choice. Basically, the longevity predictions from the stochastic models are based on the historical data and the predictions behave somewhat like extrapolation. However, there are no guarantees that the future longevity will follow the historical trends.

Instead of fitting stochastic models for the mortality rates, this study is to explore the longevity extension from examining the basic properties of survival curves. In specific, we shall check if there are signs of mortality compression (i.e., rectangularization of the survival curve) and evaluate what it means to designing annuity products. The majority of past studies for mortality compression use the graduated mortality rates and their results are likely influenced by the graduation methods used. Based on the raw mortality rates, we propose an alternative approach and some measurements to verify if there is mortality compression. We then applied the proposed method to the mortality rates of Japan, Sweden, and U.S. (Data Source: Human Mortality Database). Unlike the previous results using the graduated mortality rates, we found there are no obvious signs showing that the mortality improvements are slowing down. This indicates that the human longevity is likely to extend, at least for a while, and the longevity risk shall be considered seriously. In addition to verifying the mortality compression, we also propose some suggestions dealing with the longevity risk.

Key Words: Mortality Improvement; Longevity Risk; Mortality Compression; Graduation, Mortality Models

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