Implementation of Markov approach to Joint Life Mortality

Min Ji
University of Waterloo

Abstract: Based on the industry-wide joint life annuity data, it is shown that there is an obvious dependence between the mortalities of a couple of husband and wife, due to the effect of common life style, broken heart factor and common shock as mentioned in many papers. At the present, the research on how to model such dependence is mainly focused on parametric models, for example, Youn, Heekyung Arkady Shemyakin, and Edwin Herman (2002). Some very preliminary work has been done using the Markov approach (Li, 2006, in a Masters essay). This empiric study gets mortality rates in each state and captures the extent of dependence between wife and husband based on the available bivariate data, introduces common shock factor into Li's Markov approach, and then moves to semi-Markov model, i.e., the selection (i.e. duration) effect of mortality being modeled. Such a try aims at developing a full model reflecting more realistic joint life mortality in the pricing and risk management of a wide range of joint life products, including life insurance, annuities, pensions, and reverse mortgages.