Impacts of Longevity Risk on the Formula of Mortality Dividend for Participating Policies

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Abstract

The paper aims to investigate the correctness of the mortality dividend formula for participating policies under the environment of mortality improvement. The current formula of mortality dividend is E(mortality dividend) = (benefits – reserves) x (expected mortality – actual mortality), where $E(\cdot)$ is the expected present value. According to this formula, insurance companies always pay mortality dividend to policyholders since actual mortality is usually smaller than the pricing basis of mortality assumption due to mortality improvement. However, for some insurance products with heavy principal repayment, insurance companies have mortality gains for death benefits and mortality losses for survival benefits when the mortality improvement exists. Sometimes, the mortality losses are greater than mortality gain. But insurance companies still need to pay mortality dividend to policyholders according to the current formula of mortality dividend. It is not fair to insurance companies in this situation. The first goal of this paper is to solve this problem and to modify the current mortality dividend formula. The second goal of this paper is to employ an appropriate stochastic mortality model using unique experience mortality data obtained from more than 50,000,000 policies issued by Taiwanese life insurance companies from 1980 to 2007. This is the first paper investigating this issue.

Keywords: Mortality dividend; Mortality gains; Mortality improvement.