ABSTRACT

Joint life insurance is a type of insurance that covers two or more insured individuals, where the benefit is paid upon the first death among the participants. Traditionally, the mortality risk in joint life insurance is assumed to be independent. In fact, married couples often share common risks. The dependence structure of mortality can be modeled using Clayton's Copula, which focuses on extreme lower tail cases such as sudden death in the lower tail of the distribution. This study applies the Clayton's Copula model to calculate the annual net premium for joint life insurance for married couples, integrating stochastic interest rates using the Cox Ingersoll Ross (CIR) model. Varying interest rates are calculated using the CIR model, which takes into accounts volatility and mean reversion. The data used in this study consists the Indonesian Mortality Table IV 2019 and historical interest rates from Bank Indonesia (BI Rate) spanning from January 2009 to December 2023. Premium calculations for couples are simulated for a male starting at age 55 with coverage until age 74 under three schemes: the husband is older, younger, or the same age as the wife. The discount factor for calculating the annual net premium is obtained through interest rate forecasting for the next 19 years using the CIR model. The research findings indicate that the premium under the Clayton's Copula assumption is lower compared to the independence assumption. The smallest annual net premium is found for couples aged (55, 50) under the dependence assumption, amounting to Rp1.032.618 for a sum assured of Rp100,000,000. Premiums increase as the age of the participants at the start of the insurance rises.

Keywords: Net Premium, Joint Life Insurance, Mortality, Clayton's Copula, Stochastic Interest Rates Cox Ingersoll Ross.