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Estimation of copula-based models for lifetime medical costs

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Abstract Medical cost data are recorded through medical care and the cost is always related to some sojourn in the health status of the patient. The total medical cost accumulated in the entire lifetime of a life is of great interest to the health insurance industry and government policy makers. In this paper, we develop a new method to assess the lifetime medical cost up to the death time by incorporating the dynamics of change in the health status of the patient based on incomplete data. A copula model is proposed to fit the cost lifetime medical data subject to a terminal event (death). A two-stage estimation procedure is applied to draw the statistical inference of the marginals and the copula parameters. The asymptotic properties of the estimators are established, and a simulation is performed to evaluate the proposed model and estimation methods.

Keywords Dynamic change · Medical cost · Sojourn · Copula model · Two-stage estimation · Pseudo-likelihood