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MODELLING AND RISK ASSESSMENT OF EXTREME FIRE CLAIMS

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Day by day, lives and properties are exposed to unpredictable circumstances, causing huge losses to the entire world, which compels people to look for insurance for financial security. In contrast, extreme claims from the insured undermine insurer's profit and its sustainability. Modelling and risk assessment of extreme claims are essential for profitable business, which is an emerging topic in research. The objectives of this study are to model the extreme fire claims and thereby to assess the largest risk exposure for the future. The daily fire claims from 15th August, 2017 to 20th September, 2019 were obtained from an insurance company in Sri Lanka. The Peak Over Threshold (POT) approach of the Extreme Value Theory was employed to model the extreme fire claims. Initially, the Mean Residual Life Plot was drawn to identify the range of tentative thresholds with the POT approach to each of the tentative threshold, and the Mean Square Errors (MSEs) of fitted Generalized Pareto Distributions (GPDs) were calculated. The threshold with minimum MSE was selected as the optimum. The parameters of the GPD were estimated through the Unbiased Probability Weighted Method and the Bootstrap Goodness of Fit Test was applied to validate the GPD. Finally, the Value-At-Risk was calculated at 95% level of confidence. It was revealed that, the fire insurance claims were positively skewed with a skewness of 4.042. Then the MSEs of the GPDs, fitted to the 45 tentative thresholds between LKR 100,000 and LKR 550,000, were obtained. The optimal threshold of LKR 340,000 was exceeded by 56 claims. These exceedances can be best described by GPD (ξ = 3.343e-01, σ = 7.291e+05). Moreover, the largest claim expected in a day has not exceeded LKR 3,756,123. This information enables the insurer to take precautionary measures in designing the risk management strategies to assure a sustainable business.

Keywords: Claims, Generalized pareto distribution, Insurance, Threshold