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Estimation of the Upper Tail Dependence Coefficient for Insurance Loss Data Using an Empirical Copula-Based Approach

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Abstract : Considerable focus in the world of insurance risk quantification is placed on modeling loss values from lines of business (LOBs) that possess upper tail dependence. Copulas such as the Joe, Gumbel and Student-t copula may be used for this purpose. The copula structure imparts a desired level of tail dependence on the joint distribution of claims from the different LOBs. Alternatively, practitioners may possess historical or simulated data that already exhibit upper tail dependence, through the impact of catastrophe events such as hurricanes or earthquakes. In these circumstances, it is not desirable to induce additional upper tail dependence when modeling the joint distribution of the loss values from the individual LOBs. Instead, it is of interest to accurately assess the degree of tail dependence already present in the data. The empirical copula and its associated upper tail dependence coefficient are presented in this paper as robust, efficient means of achieving this goal.

Keywords : empirical copula, extreme events, insurance loss reserving, upper tail dependence coefficient
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