GB2 Regression with Insurance Claim Severities

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While modeling the severity component of insurance losses is well documented in the actuarial literature, it is less frequent to find claims models where regressor variables are introduced. The standard norm as of late is to use Generalized Linear Models which offer the flexibility of being able to introduce regressor variables. In this paper, we offer the alternative procedure for fitting the family of Generalized Beta of the second kind (or GB2, for short) distributions in modeling insurance claim severities when there are concomitant variables. Based on four parameters, the GB2 family offers the flexibility of allowing different degrees of skewness and tail behavior for claim severities, and at the same time, this family of distributions recovers many commonly known long-tailed distributions. The concomitant variables play the important role of allowing to understand how they affect the tail behavior of the distribution of claim severities. For application and demonstration, we used a portfolio of automobile insurance contracts to show how to estimate the model parameters together with the regression coefficients. We further consider diagnostic tools and procedures for judging the quality of the goodness of the distribution fit to the empirical data. We find that the GB2 family outperforms several other models of insurance claim severities commonly found in the literature and/or used in practice.

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