

# Log-Burr XII Regression Models with Censored Data

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## Abstract

In survival analysis applications, the failure rate function may frequently present a unimodal shape. In such case, the log-normal or log-logistic distributions are used. In this paper, we shall be concerned only with parametric forms, so a location-scale regression model based on the Burr XII distribution is proposed for modeling data with a unimodal failure rate function as an alternative to the log-logistic regression model. Assuming censored data, we consider a classic analysis, a Bayesian analysis and a jackknife estimator for the parameters of the proposed model. Studies were conducted via Monte Carlo simulation in order to evaluate the performance of the log-Burr XII and log-logistic regression models by means of variance, mean squared error and the size and power of the likelihood ratio test for both models. On the other hand, when using case deletion, all information from a single subject is deleted at once and, therefore, it is hard to tell whether that subject has any influence on a specific aspect of the model. A solution for the earlier problem can be found in a quite different paradigm, being a local influence approach where one again investigates how the results of an analysis are changed under small perturbations in the model, and where these perturbations can be specific interpretations. Residual analysis is used to check assumptions in the model.

Finally, illustrate the log-Burr XII regression proposed model using data from a randomized community trial that was designed to evaluate the effect of vitamin A supplementation on diarrheal episodes in 1,207 pre-school children, aged 6-48 months at the baseline, who were assigned to receive either placebo or vitamin A in a small city in the Northeast of Brazil from December 1990 to December 1991. The vitamin A dosage was 100,000 IU for children younger than 12 months and 200,000 IU for older children, which is the highest dosage guideline established by the World Health Organization (WHO) for the prevention of vitamin A deficiency.

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