A Bayesian Analysis of Left-Censored Durations

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Purpose: Bayes estimators for left-censored duration data are derived and their practical calculation via MCMC algorithms is presented. Both finite-sample properties and asymptotic behaviour are studied. Furthermore, the theory is applied to real rating class data and an estimation of the probability of default of creditors is carried out.

Design and Methodology: For randomly left-censored duration data, the precise durations Y_i are observed if and only if they exceed certain censoring variables C_i, respectively. Bayes estimators for this setting are implicitly defined as the minimizing argument of a loss function. Their calculation is performed by use of MCMC algorithms, because an explicit derivation is not available. The validation is done from a frequentist point of view and a comparison to the maximum likelihood estimator is presented. Strong consistency is proved by use of martingale theory.

Results and Practical Implications: It turns out that for left-censored duration data, Bayes estimators and further inferential aspects such as credibility intervals can be derived in a consistent manner and possess a relatively simple algorithmic implementation. Thus they are a reasonable alternative to other classical estimation methods such as maximum likelihood. Although both estimation procedures are asymptotically equivalent, their finite-sample properties and results for the default data considered differ markedly.

Keywords: Left Censoring, Bayesian Duration Analysis, Consistency.

References

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