

Correlated probit analysis of two longitudinal ordinal outcomes

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Abstract

Correlated probit models (CPMs) are widely used for modeling of ordinal data or joint analyses of ordinal and continuous data which are common outcomes in medical studies. When we have clustered or longitudinal data CPMs with random effects are used to take into account the dependence between clustered measurements. When the dimension of the random effects is large, finding of the maximum likelihood estimates (MLEs) of the model parameters via standard numerical approximations is computationally cumbersome or in some cases impossible. EM algorithms for one ordinal longitudinal variable [1] and for one ordinal and one continuous longitudinal variable [2] are recently developed. ECM algorithm for MLEs of CPM for two longitudinal ordinal variables will be presented. The algorithm is applied to estimation of CPM for the longitudinal ordinal outcomes self-rated health and categorized body mass index from the Health and Retirement Study. Results from fitting the model to the data and also results from some simulation studies will be reported.

References

- [1] GRIGOROVA, D., AND GUEORGUIEVA, R. Implementation of the EM algorithm for maximum likelihood estimation of a random effects model for one longitudinal ordinal outcome. *Pliska Stud. Math. Bulgar.* 22 (2013), 41–56.
- [2] GRIGOROVA, D., AND GUEORGUIEVA, R. Correlated probit analysis of repeatedly measured ordinal and continuous outcomes with application to the Health and Retirement Study. *Statistics in Medicine* 35, 23 (2016), 4202–4225. sim.6982.