A Poisson mixture regression model: application to financial data

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Abstract

Poisson regression has been recognized as an important tool for analyzing the effects of covariates on count data. However, conditional on covariates, the Poisson assumption of mean-variance equality may not be valid when data are potentially overdispersed. Alternative methods of analysis have been proposed to deal with the overdispersion problem. Poisson mixture regression models are appropriate when the extra variability comes from the unobserved heterogeneity of the population, which composes of two or more subgroups mixed in various proportions, in the presence of covariate information.

These models are applied to a real data set for credit-scoring purposes. We try to predict the number of defaulted payments of a client. The number of components in the mixture model is deemed to be unknown and estimated from the data. Using covariates in all components we aim to reveal the impact of demographic and financial variables in creating different groups of clients and to predict the group to which each client belongs, as well as his expected number of defaulted payments.

Keywords

Mixture Poisson regression models, EM algorithm, Overdispersion, Count data.

References

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