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A COMPARATIVE STUDY BETWEEN OBSERVATION- AND PARAMETER-DRIVEN ZERO-IN ATED POISSON MODEL FOR LONGITUDINAL CHILDREN HOSPITAL VISIT DATA

Abstract:

Longitudinal count data with excessive zeros frequently occurs in social, biological, medical and health research. To model zero-inflated longitudinal count data, in literature, zero-inflated Poisson (ZIP) models are commonly used after separating zero and positive responses. As longitudinal count responses are likely to be serially correlated, such separation may destroy the underlying serial correlation structure. To overcome this problem recently observation- and parameter-driven modelling approaches are proposed to model zero-inflated longitudinal count responses. In the observation-driven model, the response at a specific time point is modelled through the responses at previous times points after incorporating serial correlation into account. One limitation of the observation-driven model is that it fails to accommodate the presence of any possible over dispersion, which commonly occur in the count responses. To overcome this limitation, we introduce a parameter-driven model, where the serial correlation has been captured through the latent precess using random effects and compare the results with observation-driven model. A quasi-likelihood approach has been developed to estimate the model parameters. We illustrate the methodology with analysis of two real life data sets. To examine model performance we also compare the proposed model with the observation-driven ZIP model through the simulation study.

Keywords:

Serial correlation. Compound Poisson. ZIP models. Quasi-likelihood.

JEL Classification: C10