An empirical assessment of strategies to model opponent effects in crash severity analysis

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Abstract

Road accidents impose an important burden on health and the economy. Numerous efforts to understand the factors that affect road collisions have been undertaken. One stream of research focus on modelling the severity of crashes. Crash severity research is useful to clarify the way different factors can influence the outcome of the event. The objective of this paper is to assess different strategies to model the interactions between participants in a crash, in the context of crashes involving two parties. Towards this objective, a series of models are estimated using data from Canada's National Collision Database. Three levels of crash severity (no injury/injury/fatality) are analyzed using ordered logit models and covariates for the participants in the crash and the conditions of the crash. Modelling strategies include different ways of introducing the covariates (e.g., in a single-level or multi-level form), as well as by subsetting the dataset. The models are assessed using predicted shares and outcomes, and the results highlight the importance of considering opponent effects in crash severity analysis. On the other hand, the study suggests that hierarchical (i.e., multi-level) specifications and subsetting do not perform necessarily better than a relatively simple single-level model with opponent effects.

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