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Issues with using police citations to assign responsibility in quasi-induced exposure

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Abstract

Crash fault determination is one of the most critical issues in applications of quasi-induced exposure. Traditionally, the driver citation issued by the investigating police officer is the primary source to assign responsibility for motor vehicle crashes. Such citations are based on the "evidence" or observation of a moving violation (such as engaged hazardous actions) in combination with non-moving violations (such as suspended driver license) prior to the crash. The objective here is to identify the contributing factors that may lead to driver citations in two-vehicle crashes in addition to the hazardous action. Multivariate binary logistic regression modeling is employed to explore the behavior of the investigating police officer in terms of issuing citation at the crash scene. A series of explanatory parameters including roadway characteristics, environmental factors, and driver and vehicle attributes is assessed. The results show that whether the crash type was a hit-and-run, alcohol and illegal drug use, driver gender, driver age, and injury severity all appear to have significant impacts on the investigating officer's decision-making. Specific examples are given to demonstrate how two factors hit-and-run and drinking status can skew the exposure estimates in the context of quasi-induced exposure. The findings will help to serve as a basis to select appropriate parameters in assigning crash responsibility in quasi-induced exposure applications; and we make recommendations to modify existing crash database for better safety research in the future.

Highlights

► Driver gender, age, alcohol use, degree of injury, hazardous action, and hit-and-run crash impact driver's citation status. ► These factors result in distinctive bias impacts on the responsibility assignment and skew induced-exposure estimates. ► Hit-and-run crash likely attenuates the possibility of being given a citation for the remaining party. ► Accident responsibility shall be solely determined according to the presence of hazardous driving actions.

Keywords

Quasi-induced exposure; Responsibility assignment; Logistic regression; Driver citation; Michigan

Figures and tables from this article:

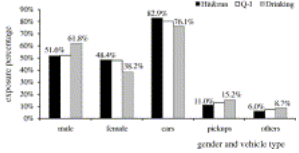

Fig. 1. Three different exposure percentage distributions by gender and vehicle type.

Figure options

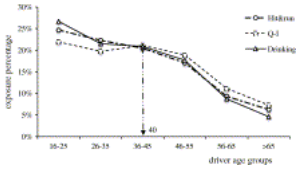

Fig. 2. Three different exposure percentage distributions by driver age.

Figure options

Table 1. Explanatory variables hypothesized to influence driver citation.

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Table 2. The association between hazardous action and citation status.

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Table 3. Descriptive statistics of explanatory variables used in the modeling.

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Table 4. Estimated results of binary logistic regression.

B is the variable coefficient; Wald is the Wald Chi-square statistic; Sig. is the significance level; OR is the odds ratio; and CI is the confidence interval.

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Table 5. Driver ' s citation categorized by hit-and-run and non-hit-and-run crashes.

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Table 6. Driver ' s citation categorized by drinking/illegal drug use status.

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Table 7. Chi-square test results of comparing three exposure estimates.

Bold notation: difference between the two estimates is not significant ($\alpha = 0.05$).

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