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The impact of driver alcohol use on crash severity: A crash specific analysis

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Abstract

This study uses a crash specific data set that is supplemented with location based socioeconomic data to estimate the impact of driver alcohol use on average crash severity. Logit estimates indicate that crashes in which the at-fault drivers had been drinking are more likely to result in a severe injury or death than are crashes caused by sober drivers. Ordered logit estimates indicate that at-fault driver alcohol use increases the expected highest degree of injury resulting from a crash, and Tobit estimates indicate that the number of injuries or deaths per crash increase an average of 0.71 when the at-fault driver has been drinking. Moreover, at-fault driver alcohol use worsens the severity of crashes relative to not-at-fault parties. Collectively, these results indicate that at-fault drinking drivers are involved in more violent crashes and produce more serious injuries to not-at-fault parties than at-fault sober drivers.

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1. Introduction

There were 42,815 traffic fatalities in 2002, 40% of which were alcohol related. The National Highway Traffic Safety Administration estimated that more than 2,163,000 alcohol involved

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crashes occurred in 2002, killing 17,419 people and injuring an estimated 513,000.¹ Of the estimated 0.62 alcohol related fatalities that occurred per 100 million vehicle miles traveled (VMT) in 2002, most (0.53 per 100 million VMT) involved high blood alcohol concentrations of 0.08 or above.² Given this information, it is not surprising that numerous studies have been conducted to identify factors that influence alcohol related fatalities and injuries.

This article provides an evaluation of individual crashes to determine the impact of driver alcohol use on crash severity, conveying a unique vantage point to the impact of driver alcohol use. In so doing, this analysis contributes to the existing body of research by exploring whether the fatality and injury levels associated with drunk driving are not only caused by increased numbers of crashes, but by more violent crashes as well. The resulting estimates lend support for the hypothesis that alcohol consumption by at-fault drivers increases the severity of crashes. This is true of both the severity of injury suffered by victims as well as the numbers of injuries and fatalities suffered per crash. These results indicate that drinking and driving policies must not only be evaluated by the reduction in the number of crashes they bring about, but also by the reduction in crash severity they bring about.

The remainder of the paper proceeds with a discussion of issues and existing evidence surrounding alcohol consumption and crash severity in Section 2. Sections 3 and 4, respectively, develop the model that is estimated, and describes the data that are used in the analysis. Section 5 reports and evaluates the results, while concluding comments are made in the final section.

2. The impact of driver alcohol use

Numerous researchers have studied the incidence of driver alcohol use, identified factors that influence the incidence of alcohol related crashes, and estimated the cost to society of driver alcohol use. Studies of the incidence of alcohol use in crashes primarily focus on the hospital records of crash victims. [Perper et al. \(1993\)](#) evaluated coroner and emergency room records, concluding that passengers face the same risk of fatality as their alcohol-positive drivers. [Waller et al. \(1997\)](#) examined blood samples from patients treated for automobile crash injuries, finding that alcohol was associated with more severe crashes than those with drug involvement or those with no drug/alcohol involvement. [Zador \(1991\)](#) examined BAC concentrations reported to the Fatality Analysis Reporting System to conclude that each 0.02% increase in BAC doubles the risk of involvement in a fatal single car crash, and that the likelihood of a crash was at least nine times greater at BACs in the 0.05–0.09% range than at 0% BAC for all age groups. Similarly, [Robertson and Drummer \(1994\)](#) evaluated 341 driver fatalities to determine that the *relative* risk of having a fatal crash increased with increased BAC. [Ferrara et al. \(1994\)](#) reviewed 38 studies of the impact of low alcohol concentrations (below 0.1%) on driving, and found no consensus on whether or not low BAC levels significantly contribute to crash losses.

Several investigations have been conducted on the impact of alcohol on the behavior of drivers involved in crashes. [Haffner and Graw's \(1996\)](#) examination of 625 crashes caused by alcohol-impaired drivers revealed that speed was the most common cause of crashes involving an alco-

¹ *Initiatives to Address Impaired Driving*, National Highway Traffic Safety Administration, December 2003, pp. 4–5.

² *Initiatives to Address Impaired Driving*, National Highway Traffic Safety Administration, December 2003, pp. 7–9.

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