IMPACTS OF HELMET LAW CHANGES ON MOTORCYCLISTS’ FATALITIES IN THE UNITED STATES

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ABSTRACT
A motorcycle helmet has been considered a very important safety equipment for motorcyclists as it prevents or minimizes head and traumatic brain injuries which are often fatal. Hence, most of the states in the United States have enacted a law requiring all motorcyclists to wear helmets in the 1960s and 1970s, which is also known as the Universal Helmet Law (UHL). Nevertheless, some states began to repeal or restrict the law since then. After several years, one state has re-enacted the UHL as it has realized that the law was quite effective in reducing motorcycle fatalities. There have been three states with changes in their helmet laws in the 2000s. Florida and Pennsylvania repealed the UHL in 2000 and 2003, respectively, and they only require underage motorcycle riders to wear helmets. In contrast, Louisiana re-enacted the UHL in 2004. The prior studies have consistently discovered that the UHL repeal put motorcyclists in danger whereas the re-enactment significantly increases helmet-use and decreases motorcycle fatalities. Nevertheless, the prior studies have only evaluated short-term effects of the law change mostly using the traditional before-after approach (it is called naïve before-and-after study). The naïve approach assumes that there is no change from the ‘before’ to ‘the after’ period that affected the safety of the entity under scrutiny; hence, the naïve approach is not able to account for the passage of time and its effect on other factors such as exposure, maturation, trend, and regression-to-the-mean bias.

In order to account for the influence of a variety of external causal factors that change over time, the before-and-after study with comparison group and the before-and-after study with Empirical Bayes (EB) approaches are adopted in this research. A series of SPF$s (safety performance functions) were estimated for motorcycle crashes using county-based data. The expected numbers of crashes were calculated using the SPF$s to estimate more dependable CMFs (crash modification factors). The authors have attempted to explore the long-term impacts of repeal and reinstatement of the universal helmet law by using 13 to 16 years of data. A range of safety performance functions were developed based on counties and calculated the expected motorcycle fatal crashes.

From this study, it was found that approximately 19% to 41% of motorcycle fatal crashes have increased after the UHL repeal while the UHL reinstatement has reduce the number of motorcycle fatal crashes by about 21% to 27%. One of the most significant findings in this study is that the UHL repeal still has significant effects on motorcycle fatal crash counts after seven to nine years (30.5% and 14.5% increases in Florida and Pennsylvania, respectively) and even ten to twelve years after the UHL repeal (26.7% increase in Florida). On the other hand, the UHL reinstatement was found to be very effective to reduce...
motorcycle fatal crashes in the long-term analysis, even 7-9 years after the reinstatement (27.0% decrease in Louisiana).

In addition to estimating the effect of the UHL on fatal crashes, the motorcycle helmet-use trend has been explored in three states. In Florida, the percentage of motorcyclists using helmet was above 90% before the UHL repeal. It has decreased to less than 50% after the repeal. On the other hand, Florida’s comparison states have about 50-60% and showed no significant difference before and after the Florida’s UHL abolishment. Both Pennsylvania and its comparison states have approximately 80-90% of helmet-use before the Pennsylvania’s UHL abolishment. Pennsylvania’s helmet-use has decreased to 50-60% while no changes have been observed in its comparison states. Louisiana’s UHL re-instatement resulted in the significantly increased helmet-use. Before the re-instatement, the helmet-use was about 30-40% in both Louisiana and its comparison states. After the re-enactment, the helmet-use in Louisiana has increased to 80-90% whereas its comparison sites did not show any remarkable changes. It is deduced that the UHL changes brought about the change in the helmet-use behavior, and eventually the motorcyclist fatalities.

According to the findings from this study, it is strongly recommended to re-enact (or enact) the UHL requiring all motorcyclists to wear helmets to effectively save the lives of riders. Although it is obvious that the UHL significantly reduces motorcycle fatal crashes, it might not be an easy process to enact the UHL as it may be a political issue and needs considerable efforts and time to collect and reflect public opinion. Therefore, education and awareness campaigns can be one way to increase the helmet-use. In addition to education and awareness campaigns, in the states with the UHL, enforcement can be also an effective way to increase the helmet-use of motorcycle riders.