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Evaluating the Effectiveness of a 0.08% BAC Limit and Other Policies Related to Drunk Driving

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Abstract

During the 1980s and 1990s in the United States, a large number of new policies have been adopted with the aim of reducing drunk driving. The value of many of these policies is controversial in policymaking circles. Recently the illegal per se blood alcohol content (BAC) limit, which is either 0.10% or 0.08% in nearly all states, has come under scrutiny from the federal government. This study presents new findings on the effectiveness of the 0.08 BAC limit, and drunk driving policies in general. The results indicate that the incremental effect of moving from a 0.10% BAC limit to a 0.08% standard lowers fatal traffic crash rates by 2.6%. This study analyzes the timing of the effects of the 0.08% limit, and finds that conventional empirical models do not capture an interesting pattern, in which the strongest effects of the law do not appear to set in until several years after enactment. Also, this paper sketches a welfare analysis of the change from a 0.10% limit to a 0.08% limit. In the context of the drunk driving policy literature in general, the paper evaluates two factors which have previously been ignored in this type of analysis: graduated licensing programs and the Mothers Against Drunk Driving (MADD) organization. Both initiatives are estimated to reduce fatal traffic crash rates. Graduated licensing, in fact, appears to be one of the most effective initiatives, reducing fatal crash rates for all drivers by 4.7%, and fatal crash rates for drivers under 21 by 11.5%. Other apparently significant policies are open container laws (5.1% reduction in fatal crash rates for all drivers), dram shop laws (5.8%), seat belt laws (4.9%), and beer taxes (0.8% per 10 cents). This paper also provides new evidence on "zero tolerance" BAC limits for drivers under 21, indicating that these laws reduce fatal crash rates for under 21 drivers by 6.1%, but only in the presence of administrative license revocation (ALR) laws.

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I. Introduction

The intense lobbying by interest groups and wrangling by legislators that took place over a particular provision in the 2000 Federal Transportation Appropriations Bill epitomizes the controversy surrounding the issue of how to address drunk driving in the United States. On one side, organizations such as Mothers Against Drunk Driving and the American Medical Association, along with Congressmen including Senator Frank Lautenberg (D - NJ), supported a provision that would require states to adopt 0.08% blood alcohol content (BAC) standard for drunk driving, or else lose federal highway funding. On the other side, restaurant and bar advocacy groups like the American Beverage Institute (ABI) and legislators including House Majority Whip Tom Delay (R - TX), opposed any such provision. The compromise solution which was signed by President Clinton in October 2000 specified that states which do not adopt the 0.08 limit will lose 2% of federal highway funds in 2003, 4% in 2004, 6% in 2005, and 8% in 2006 and in years thereafter. However, states which adopt the limit by 2007 will recoup any previously lost funds.

The division in the U.S. over the 0.08 law is mirrored in the fact that states have had for many years significantly different laws related to drunk driving, and traffic safety more generally. For this reason, among others, an important question is how effective are the various policies in reducing drunk driving and its adverse consequences? In the tradition of a substantial body of economic, public health, and traffic safety literature, this paper takes up the question, with particular emphasis on the currently controversial 0.08 BAC law. Specifically, this paper examines the extent to which the 0.08 BAC law and other initiatives reduce fatal traffic crashes.

This study presents new findings for the literature on the 0.08 BAC law, and the drunk driving policy literature in general. In evaluating the BAC law, the analysis controls for two factors previously ignored in other studies: graduating licensing programs and the presence of MADD. These additional controls, in combination with the most recent data, which is essential due to the fact that over half of the 0.08 states adopted the limit in 1994 or later, yield results that indicate that the incremental effect of moving from a 0.10 BAC limit (which most states still have) to a 0.08 standard lowers

traffic crash rates by 2.6%. This estimate is lower than most previous estimates, but still statistically significant. In addition, this study presents a novel analysis of the timing of the effects of the 0.08 limit, and finds that the strongest effects of the law do not appear to set in until several years after enactment. Based on these estimates, this paper sketches a welfare analysis of the change from a .10% limit to a .08% limit, with a view towards the decision faced by policymakers in states which will have to decide when, if ever, they wish to comply with the federal incentive program that was recently passed.

In the context of the drunk driving policy literature in general, the analysis provides new evidence that both MADD and graduated licensing programs are important factors in reducing fatal traffic crashes. Graduated licensing, in fact, appears to be one of the most effective initiatives, reducing fatal crash rates by 4.7%. Other apparently significant policies are open container laws (5.1%), dram shop laws (5.8%), seat belt laws (4.9%), and beer taxes (0.8% per 10 cents). The paper also provides new evidence on "zero tolerance" BAC limits for drivers under 21, indicating that these laws reduce fatal crash rates for under 21 drivers by 6.1%, but only in the presence of administrative license revocation (ALR) laws.

The paper is organized as follows. Section II provides background information on drunk driving and policies related to this problem in the United States. Section III summarizes the existing literature on the effect of the 0.08 BAC law and other initiatives, and describes how this study relates to the literature. Section IV details the empirical model, data, and variables used in the analysis. Section V then presents the results. Finally, Section VI sketches a welfare analysis of the 0.08 BAC law, and Section VII concludes the paper.

II. Background

Policies related to drunk driving

The last twenty years in the United States have witnessed a barrage of public policy measures related to drunk driving, with hundreds of laws being passed on the state level, as well as several bills on the federal level. The various measures can be categorized into the following groups (see Table 2.1): direct deterrence of drunk driving;

indirect deterrence of drunk driving; general alcohol control; and general vehicle safety. Measures in this last category, general vehicle safety, are related to drunk driving in the sense that they might be expected to mitigate the adverse consequences of drunk driving.

The first category, direct deterrence measures, includes the illegal per se BAC limit which continues to generate controversy in public policy debates. In 1980 most states either had no per se limit at all or had a limit higher than 0.10, but by 2000 all states except for Massachusetts[2] had a limit of either 0.10 or 0.08. For drivers under 21 years old, the per se limit has been set at 0.02 or lower in all states during the last twenty years. In most states, these so-called "zero tolerance" laws for young drivers were adopted during the mid or late 1990s.

While the per se limit sets a standard for what is considered illegal drunk driving, other direct deterrence measures prescribe the consequent penalties. Administrative license revocation (ALR) laws, which allow for immediate revocations of driving licenses upon failure of a BAC test (as opposed to allowing the offender to retain the license at least until court proceedings), appeared in states beginning in the early 1980s, and were present in 42 states by 2000. Other penalties which have been adopted largely in the past two decades include mandatory minimum jail time and mandatory minimum fines for driving under the influence (DUI) offenses.

Table 2.1: Summary of initiatives related to drunk driving and traffic safety

"Direct" deterrence	"Indirect" deterrence	General alcohol control	General vehicle safety	Other
per se BAC limit	Prelim. breath tests	open container	seat belts	grassroot (MADD)
zero tolerance	Implied consent	MLDA	speed limits	
ALR	Sob. checkpoints	alcohol taxes	grad.licensing	
Mandatory jail	Anti-plea bargains			
Mandatory fines	"Comparative" negl.			
	Dram shop			

A handful of polices fall into the second category, indirect deterrence measures, because, while they do not designate standards nor penalties for drunk driving, they are designed to affect the expected costs faced by a potential drunk driving offender in less

[2] Although MA has no illegal per se limit, it has a 0.08 limit for "presumptive evidence" and for ALR.

direct ways. Three such measures increase the probability that a potential offender will be apprehended by police officers: preliminary breath test (PBT) laws, implied consent laws, and sobriety checkpoints. All three of these measures have become increasingly prevalent over the last twenty years. PBT laws allow police officers to give drivers "preliminary breath tests" with handheld BAC sensor devices; the officers can then use the results of these tests to decide whether to arrest the driver (and then administer a more accurate chemical test). Implied consent laws require drivers to submit to BAC tests, or else face prescribed penalties (which normally include ALR). Sobriety checkpoints are programs where police officers randomly pull over cars at a particular location and administer BAC tests to the drivers.

Other indirect deterrence measures do not involve the probability of apprehension, but rather the probability of high penalties, given that an offense has occurred. First, anti-plea bargaining laws prevent DUI offenders from reducing their offenses to lesser crimes. Next, in cases of traffic crashes involving multiple parties, states have differing standards for establishing tort liability. For example, a general trend in the United States during the 1980s was a switch from "contributory negligence" to "comparative negligence" (Sloan et. al 1994). Finally, dram shop laws operate as deterrents on an even more indirect level than the above laws by targeting not the drivers but the people serving alcohol to them. They provide for the possibility that establishments serving alcohol to intoxicated patrons can be held liable for subsequent crashes caused by the patrons. Along with anti-plea bargaining laws and comparative negligence laws, dram shop laws have proliferated in the U.S. during the last twenty years.

The third category of policy measures mentioned at the outset of this section, general alcohol control measures, comprises laws which are directed at alcohol consumption, but not drunk driving specifically. This category includes open container (in vehicles) laws, minimum legal drinking age (MLDA) laws, and alcohol taxes, all of which have changed significantly since the early 1980s. Open container laws prohibit open containers of alcohol in moving motor vehicles (regardless of whether the driver is consuming alcohol). The number of states with such a law has increased from 18 in 1982 to 32 in 2000. MLDA laws underwent a great amount of change during a more narrow

period, from 1980 to 1988, during which 38 states raised their MLDAs to 21 years. By 1988 all 50 states plus D.C. had MLDAs of 21, largely due to a 1986 federal incentive program designed to establish a uniform MLDA of 21. Alcohol taxes, meanwhile, might be considered the one outlier among all of the measures mentioned here, in that they have generally moved in recent years in a direction that would be expected to lead to more, not less, drunk driving. In many states the real values of the beer tax, for example, have fallen as the nominal values have remained unchanged.

General vehicle safety measures constitute a fourth category of policies that have seen a flurry of action during the last two decades. As mentioned above, these policies relate to drunk driving because they might be expected in general to mitigate the harm caused by drunk driving crashes. Seat belt laws, for example, arrived in the 1980s, and by 2000 every state except New Hampshire had adopted one. Speed limit laws have also undergone substantial changes during the 1980s and 1990s, mostly due to bills from the federal level. In 1987, Congress relaxed the 1974 National Maximum Speed Limit (NMSL) of 55 mph, allowing states to post 65 mph speed limits on rural interstates. Then in 1995 Congress repealed the NMSL altogether, leading many states to raise rural highway limits to above 65 mph, and some urban highway limits to 65 mph. Finally, in contrast to speed limits, a policy measure referred to as "graduated licensing" has seen a lot of recent activity at the state level. Graduated licensing refers to programs in which teenage drivers gain privileges over the course of a number of steps with prescribed time intervals, assuming that the drivers maintain clean records at each step. The National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) defines a specific model for the program, with a number of core provisions: a learner's phase of at least six months, which can begin at age 16; an intermediate phase of at least six months, during which unsupervised driving is prohibited at night; and a requirement that applicants for intermediate and full licenses have no safety belt or zero tolerance violations, nor any other major traffic violations. States began adopting such programs largely in the latter half of the 1990s; by 2000, 18 states had programs which the NCUTLO considered "full" graduated licensing, and 6 had what the committee considered "partial" graduated licensing.

In addition to the many policy initiatives over the last twenty years, one other important force designed to address drunk driving arrived on a large scale in the United States: non-profit, grassroots organizations. The most prominent of these organizations, Mothers Against Drunk Driving (MADD), began in 1980 in California, and has since grown to over 300 chapters, with at least one in 49 different states, in addition to hundreds of less formal affiliates called community action teams. MADD and other organizations have been active on a number of fronts related to drunk driving, including public awareness, legislative lobbying, victim support, and educational programs.

How do we measure the "effectiveness" of these policies?

In the process of evaluating the effectiveness of the initiatives described above, it is not obvious how exactly to define the outcome measure of interest. Should we be concerned simply with the prevalence of drunk driving, i.e. the percentage of drivers on the road who exceed a certain BAC level? Or should we take into account the entire distribution of BACs among drivers on the road? Alternatively, one could make a reasonable argument that BAC levels only matter to the extent that they lead to crashes, and thus we should focus only on drunk driving-related crashes. Section III discusses which outcome measures have received attention in previous literature, and Section IV discusses the measures chosen for this study. This section provides background on the general trends in various outcomes related to drunk driving, which by any measure have shown improvement over the last two decades in the United States.

First, the little data on drunk driving prevalence that is available indicates that the proportion of drivers with high BAC levels has fallen substantially since the 1970s. The only source of national data based on actual BAC testing of drivers is the National Roadside Survey, which has been conducted on three occasions: 1973, 1986, and 1996. Table 2.2 summarizes the results from the surveys. The results indicate substantial decreases from 1973 to 1986 in the proportion of drivers, both male and female, with BACs above .05% or .10%. There appears to have been a further slight decrease in drunk driving among males from 1986 to 1996, in contrast to a slight increase

among females during that time. Voas et. al (1998), however, point out that the changes between 1986 and 1996 are not statistically significant.

Table 2.2: National Roadside Surveys on DUI prevalence (weekend nights)

	BAC results, males			BAC results, females			BAC results, total		
	N	>=.05 (%)	>=.10 (%)	N	>=.05 (%)	>=.10 (%)	N**	>=.05 (%)	>=.10 (%)
year									
1973	2648	14.7	5.5	526	8.8	3.0	3192	13.7	5.1
1986	2114	9.9	3.9	728	3.9	1.3	2850	8.4	3.2
1996	4229	8.7	3.5	1984	5.8	1.5	6480	7.7	2.8

*table adapted from data presented in Voas et. al (1998)

** the total number of people does not add up exactly to the sum of the males and females, because gender was not recorded in a small handful of cases

Other data on the prevalence of drunk driving comes from surveys which ask people questions regarding drunk driving. The Health Promotion and Disease Prevention supplement to the 1985 National Health Interview Survey, for example, asks respondents "During the past year, how many times did you drive when you had perhaps too much to drink?". In recent years, the CDC's Behavioral Risk Factor Surveillance System (BRFSS) has asked respondents a question that is identical except that they ask about the past month rather than year. Of course, the value of these self-reported data is limited due to the subjective nature of the questions. The National Survey of Drinking and Driving Attitudes and Behavior, conducted by the NHTSA in 1991, 1993, 1995, and 1997, provides somewhat more objective information by asking respondents whether they have driven in the last year after drinking at all within the two preceding hours. The percentage of respondents who said yes fell from 28% to 24% between 1991 and 1995.

Like the DUI prevalence data from the National Roadside Surveys, drunk driving crash data show a general downward trend over the past couple decades. The National Highway Traffic Safety Administration (NHTSA) collects data on crashes of all different severity levels, but provides by far the most comprehensive and accurate data for those crashes which involve fatalities. NHTSA's Fatal Accident Report System (FARS) constitutes a complete census of fatal traffic crashes, with a large amount of information regarding each crash, including the BAC level of a majority of the drivers

involved. For those drivers whose BACs were not tested, NHTSA uses a discriminant analysis to impute the probability that they had a BAC of 0, between 0.01 and 0.10, or greater than 0.10, based on factors such as the police report, the time of day, and how many vehicles were involved (Klein 1986).

Table 2.3 displays trends in various fatal traffic crash rates for the United States between 1982 and 1999. The three lower trend lines, which are for drivers of all ages, show that the total fatal crash rate has fallen substantially, but most, if not all, of this decrease, can be accounted for by the large drop in high BAC fatal crash. The upper trend line, on the other hand, indicates that the fatal crash rate for 16-20 year olds rose between 1982 and 1988, fell between 1988 and 1992, and then rose back to the level of the early 1980s by 1999. Furthermore, in each year the total fatal crash rate for 16-20 year olds is about twice as high as the rate for all ages.

Table 2.3: Fatal accidents per 10,000 people