Journal of Health Economics 29 (2010) 241–249

Contents lists available at ScienceDirect

Journal of Health Economics

journal homepage: www.elsevier.com/locate/econbase

Social host liability for minors and underage drunk-driving accidents

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ARTICLE INFO

Article history:
Received 23 September 2008
Received in revised form 7 October 2009
Accepted 7 December 2009

JEL classification:
H11
K42

Keywords:
Drunk driving
Social host
Alcohol
Traffic fatalities

ABSTRACT

Social host laws for minors aim to reduce teenage alcohol consumption by imposing liability on adults who host parties. Parents cite safety reasons as part of their motivation for hosting parties, preferring their teens and their teens' friends to drink in a supervised and safe locale. Both sides predict an effect of social host liability for minors on alcohol-related traffic accident rates for under-aged drinkers; the effects, however, work in opposite directions. This paper finds that, among 18–20 year olds, social host liability for minors reduced the drunk-driving fatality rate by 9%. I find no effect on sober traffic fatalities. Survey data on drinking and drunk driving suggest the declines resulted mostly from reductions in drunk driving and not reductions in drinking.

1. Introduction

Motor vehicle accidents are the leading cause of deaths for adolescents in the U.S.[1] Alcohol contributes to a significant fraction of these deaths: 14% of driver fatalities occur due to driving under the influence. Since the mid-1970s, states have passed a series of laws seeking to reduce underage access to alcohol and improve driver safety. States raised minimum legal drinking ages, lowered the maximum blood alcohol content to be legally sober for adults and for underage drinkers, required graduated driver licensing of teenagers, and passed more restrictive seat belt laws.

Previous studies highlight the effects these laws and other alcohol policies, such as alcohol taxes, have on drinking, on underage drinking, driving under the influence of alcohol, and motor vehicle fatalities. Dee (1999) and Dee and Evans (2001) provide an overview of this literature. One policy that appears to be overlooked in the literature, however, is social host laws for minors.

Although providing alcohol to minors is illegal in all states (APIS, 2007), social host laws for minors increase the potential penalties. Hosts of a private party can acquire civil liability if they provide alcohol to minors and that act leads to the injury to a third person. These laws make it illegal to provide any alcohol to minors even on private property and, typically, make hosts liable for underage drinking on their property. Most minors obtain alcohol from adults of legal drinking age. Further, most underage drinkers typically drink alcohol in their own or someone else's home (Pemberton et al., 2008). The added liability, referred to as a social host law for minors, specifically targets underage access to alcohol.

Social host laws for minors (SHLM) became increasingly common in the United States in the 1980s and early 1990s. This paper tests whether the adoption of SHLM affected drunk driving by teenagers. This is an inherently empirical question. These laws may reduce drunk driving by raising the price of alcohol to underage drinkers and reducing their alcohol consumption. In response to the laws, social hosts may improve their monitoring of guests and pressure guests to reduce their drinking, drunk driving, or other risky activities. On the other hand, these laws may increase drunk driving by relocating underage drinking from their own homes and adult supervision to more distant locales, by increasing the consumption of substitute goods that may impair teens' driving, or both.

Using state-level traffic fatality data for 1975 through 2005, I estimate the effect of SHLM on traffic fatalities involving and not involving alcohol. I find that these laws appear to reduce drunk-driving fatalities but are uncorrelated with sober traffic fatalities. Survey data for 1984 through 2004 suggest that SHLM reduced

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[1] Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online] (2008). National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Available from: www.cdc.gov/ncipc/wisgars.

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doi:10.1016/j.jhealeco.2009.12.001

drunk driving but only modestly, if at all, reduced alcohol consumption. The effectiveness of SHLM may stem from social pressure applied by party hosts to reduce their guests' drunk driving and their own liability.

2. Empirical methods: traffic fatalities and SHLM

Social host laws for minors theoretically have three effects. First, they raise the price of underage drinking; downward sloping demand curves imply this reduces underage drinking. Proponents of these laws tend to cite the unseemliness of parents, in particular, allowing underage drinking.[2] Second, others argue that teenagers will drink anyway and that teenagers are safer drinking at home with adult supervision than without supervision. Raising the liability for adults providing these opportunities may make teenagers less safe by increasing the likelihood of driving after drinking.[3] Third, SHLM strengthen the incentive for social hosts to monitor and encourage guests not to drink and drive; in an effort to reduce their own liability, social hosts may reduce drunk driving.

I estimate the effect of SHLM on teen traffic fatalities involving alcohol. If social host laws effectively reduce teen drinking or drunk driving instead of pushing teens towards drinking further from home, then the fraction of teens killed in traffic accidents involving alcohol will fall. Alternatively, if the dominant effect is to increase teens' drinking further from home and, presumably, teen drunk driving, then the fraction of teens killed in traffic accidents involving alcohol will increase. Social host laws for minors should have no effect on fatalities stemming from non-alcohol-related accidents.

I consider how social host laws affect traffic fatalities of 18–20 years olds by estimating the following:

$$\ln\left(\frac{fatality\_rate_{it}}{1-fatality\_rate_{it}}\right) = X'\beta + \alpha SHLM_{it} + \delta_t + \theta_i + \gamma_i t + \varepsilon_{it}$$

The log-odds ratio of traffic fatalities accounts for the discrete nature of a traffic fatality at the individual level (Ruhm, 1996).

The regressions control for a variety of alcohol- and driving-related policies: the minimum legal drinking age, beer taxes, whether the state has lowered its maximum legal blood alcohol content to 0.08, whether a seat beat law is in existence, whether a state has a zero-tolerance law, and whether the state has a graduated driver license program. Prior research suggests each of these policy changes may have played a role in altering behavior. Dee (1999) finds that a higher minimum legal drinking age reduced traffic fatalities, although Miron and Tetelbaum (2009) argue that this effect is quite small. Saffer and Grossman (1987) suggest that beer taxes reduce traffic fatalities although Dee (1999) finds that this result is not robust to the inclusion of additional control variables. Dee (2001) shows that lower legal blood alcohol limits for adults also reduce traffic fatalities. Seatbelt laws consistently correlate with fewer traffic fatalities (for example, Cohen and Einav, 2003), particularly for youth (Carpenter and Stehr, 2008). Other research suggests that zero-tolerance laws, laws that lower the legal blood alcohol level of persons under 21 to 0.02 or less, reduce alcohol-related highway fatalities (Eisenberg, 2003) and heavy episodic drinking for underage males (Carpenter, 2004). Dee et al. (2005) find that graduated driver licensing programs, which require teenagers to ease into independent driving, reduced traffic fatalities by teens.

In addition to these alcohol- and driving-related policies, the regressions control for the total vehicle miles traveled, the state unemployment rate, average per capita income, state fixed effects, and year dummies. I present specifications with and without state-specific trends. Dee (1999) highlights the importance of state fixed effects and state-specific trends when estimating the effects of alcohol policies.

The variable of interest is an indicator for whether a state has a SHLM. The estimated coefficient on SHLM is α. The percentage reduction in traffic fatalities associated with SHLM is the product of α and one minus the fatality rate. The likelihood of a teenager dying in a traffic accident is quite small. The coefficient, α, provides a close approximation of the percentage reduction in traffic fatalities associated with SHLM.

By controlling for a wide variety of other alcohol-related policies as well as the state trends, fixed effects, and year effects, any bias in the estimate of α must arise from differing within-state trends prior to the court finding. Estimates of the effect of social host laws are biased if the laws are passed in response, for example, to increasing traffic fatality rates. I explore this possibility below by estimating how the effect of social host liability changes with the time before and after passage of the law.

To correct for heteroskedasticity, regressions are appropriately weighted for the log-odds ratio dependent variable. Following Ruhm (1996), this regressand implies that the variance of the error term is:

$$(fatality\_rate_{it}(1-fatality\_rate_{it})pop_{it})^{-1}$$

where *pop* is the population of the relevant age-group. Standard errors are clustered by state.

Three measures of teen traffic fatalities are considered: fatalities where the accident included anyone who was drinking, fatalities where the accident included a drunk driver, and fatalities where the accident did not involve any alcohol. The first two types of traffic fatalities examine whether SHLM reduce drunk driving, and therefore fatalities due to drunk driving. I analyze non-alcohol-related traffic fatalities as a counter-factual: SHLM should have no effect on these fatalities.

3. Data

In 1975, seven states imposed civil liability on social hosts for providing alcohol to minors: Iowa, Indiana, Louisiana, Minnesota, Mississippi, North Dakota, and Oregon.[4] In the mid-1980s, this number increased rapidly. By 1992, 25 states had social host laws applicable to minors. In most cases, a SHLM arose when the state supreme court judged that existing laws allowed for social host law liability when the imbibing party was a minor. Table 1 presents the dates associated with the relevant decision or legislation for each state with SHLM. Fig. 1 graphs the fraction of states with SHLM over time. This fraction increases beginning in the late 1980s, leveling off near the end of the 1990s.

State-level data on traffic fatalities are from the Fatality Analysis Reporting System (FARS) for 1975–2005. I analyze three types of teenage traffic fatalities: fatalities from accidents involving alcohol, fatalities from accidents involving a drunk driver, and fatalities from accidents not involving alcohol. Fig. 2 presents nationally

[2] See, for example, MADD's webpage on social host liability: http://www.madd.org/Professionals/Social-Host/Social-Host-Liability.aspx.

[3] Although the public debate tends to involve a discussion of whether parents should provide alcohol to their teens, SHLM applies to any adult providing alcohol to a minor. Police use the laws, in some locales, to crack down on underage parties whether or not a parent is present.

[4] Mothers Against Drunk Driving (MADD) provides a state-by-state summary of social host liability including relevant legal decisions and legislative behavior.

Table 1
Effective dates of social host laws for minors by state.

States with SHLM in 2005		States without SHLM in 2005
Alabama	1987	Alaska
Arizona	1994	Arkansas
Colorado	1997	California
Connecticut	1988	DC
Florida	1999	Delaware
Georgia	1985	Hawaii (currently has SHLM but not in 2005)
Idaho	1991	Kansas
Illinois	1991–1995, 2004	Kentucky
Indiana	1974	Maryland
Iowa	1972	Missouri
Louisiana	1972	Nebraska
Maine	1987	Nevada
Massachusetts	1986	Oklahoma
Michigan	1985	Rhode Island
Minnesota	1972–1977, 1990	South Carolina
Mississippi	1975	South Dakota
Montana	1985	Texas
New Hampshire	1995	West Virginia
New Jersey	1984	
New Mexico	1984	
New York	1986	
North Carolina	1992	
North Dakota	1975	
Ohio	1988	
Oregon	1971	
Pennsylvania	1983	
Tennessee	2005	
Utah	1994	
Vermont	1986	
Washington	1992	
Wisconsin	1985	
Wyoming	2003	

Source: Mothers Against Drunk Driving (2007).

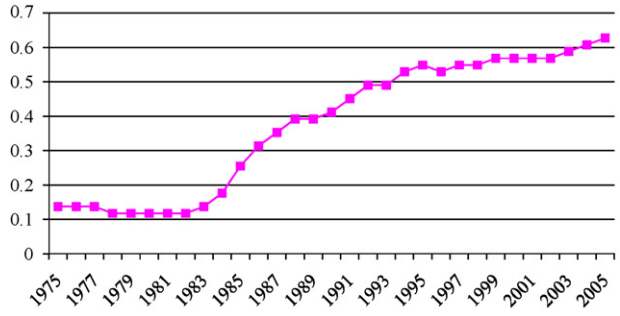

Fig. 1. Percent of states with social host laws for minors, 1975–2005.

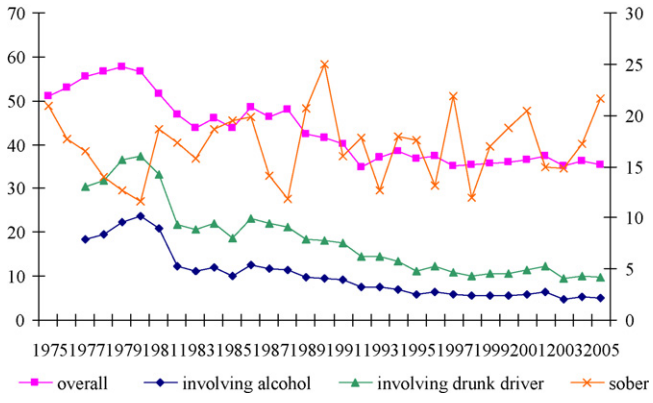

Fig. 2. U.S. traffic fatalities per capita aged 18–20, 1975–2005.

aggregated traffic fatalities of 18–20 year olds divided by the population aged 18–20 years old.[5] Teenager traffic fatalities increased somewhat between 1975 and 1979; decreased for several years before mildly increasing again in the mid-1980s; after another decline between 1989 and 1992, the traffic fatality rate for 18–20 years olds has been relatively stable around 36 fatalities per 100,000.

Traffic fatality rates for accidents involving alcohol closely track fatality rates involving a drunk driver. In both cases, there is an increase in the rate in the late 1970s, a quick decline, and then a general trend downwards from the late 1980s until the present. Traffic fatality rates for accidents not involving alcohol show much less of a trend. The rate increases slightly over the 30 years; the series demonstrates more variance over time.

Summary statistics for the outcomes of interest as well as the control variables appear in Table 2. The table presents means and standard deviations separately for state-years with a social host law for minors, state-years without, and for the whole sample. The summary statistics suggest that alcohol-related traffic fatalities are less common in state-years with SHLM than state-years without SHLM. Sober fatality rates for both sections of the sample are similar.

State-years without a SHLM differ from those with a SHLM in other respects. State-years with a SHLM are more likely to have tougher drinking- or driving-related legislation such as a higher minimum legal drinking age, lower blood alcohol limits, zero-tolerance laws, graduated driver licensing programs, and seat belt laws although beer taxes are lower. In addition, the unemployment rate is lower, per capita income is higher, and fewer vehicle miles are traveled.[6] These differences in factors potentially related to traffic fatalities warrant the multivariate regressions presented in the next section.

4. Results

Results from a multivariate regression of traffic fatality rates on social host laws, a set of control variables, state fixed effects, and year dummies appear in Table 3. Column (1) presents estimates for fatalities involving drinking; column (2) for those involving drunk drivers; and column (3) for sober accidents. Columns (4)–(6) present estimates including state-specific trends. These results suggest that SHLM reduced traffic fatalities from accidents involving alcohol and had no effect on fatalities from accidents not involving alcohol.

Few of the control variables have statistically significant effects. Lower legal minimum drinking ages raised alcohol-related fatalities relative to a 21 legal minimum drinking age. Laws lowering the maximum BAC correspond to reduced fatalities from drunk drivers and increased sober fatalities. More driving is associated with fewer alcohol-related fatalities. As in the pooled cross-sectional estimates in Dee (1999), I observe no statistically significant effect of beer taxes on youth traffic fatalities when state trends are included.

The results for SHLM are suggestive; any potential bias must arise from these laws arising in response to changes in the alcohol-related traffic fatalities' trend for that state. One example would be if a rash of teenager deaths in alcohol-related accidents leads

[5] The United States Census Bureau provides the population figures.

[6] The Federal Highway Administration (various years) provided the vehicle miles traveled. The Bureau of Labor Statistics provided per capita income rates and unemployment rates. Beer tax data are from the United States (various years); blood alcohol level laws and mandatory seat belt laws from the Insurance Information Institute (various years). Dee et al. (2005) provided the state graduated licensing programs. The Distilled Spirits Council of the United States DISCUS (1996) provided the minimum legal drinking age laws.

Table 2
Summary statistics by presence of social host law for minors.

	No SHLM		With SHLM		Overall	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Social host law for minors					0.40	0.49
Log-odds ratio of traffic fatalities with						
Drinking involved	−9.07	0.76	−9.73	0.89	−9.35	0.88
Drunk driver	−9.33	0.69	−9.96	0.83	−9.59	0.81
Sober	−8.77	0.50	−8.73	0.45	−8.75	0.48
Minimum legal drinking age is						
18	0.20	0.40	0.05	0.22	0.14	0.35
19	0.13	0.34	0.02	0.15	0.09	0.28
20	0.04	0.21	0.00	0.04	0.03	0.16
Unemployment rate	6.14	2.06	5.56	1.80	5.90	1.98
Per capita income	15,849	7821	22,391	8246	18,465	8610
Beer tax	0.54	0.22	0.50	0.14	0.52	0.19
Blood alcohol limit is 0.08	0.12	0.32	0.30	0.46	0.19	0.39
Zero-tolerance law	0.22	0.41	0.51	0.49	0.34	0.47
Any seat belt law	0.42	0.49	0.76	0.42	0.55	0.49
Graduated driver licensing program	0.10	0.29	0.26	0.43	0.16	0.36
Total vehicle miles traveled (in 000s)	42.9	52.2	46.1	34.7	44.2	46.1

Table 3
Multivariate regression of traffic fatalities on alcohol laws and control variables, 1977–2005.

	Logged odds ratio of traffic fatalities					
	(1) Drinking	(2) Drunk driver	(3) Sober	(4) Drinking	(5) Drunk driver	(6) Sober
SHLM	−0.260*** (0.084)	−0.275*** (0.071)	−0.029 (0.041)	−0.142* (0.081)	−0.192*** (0.071)	0.005 (0.048)
Minimum legal drinking age is:						
18	0.001 (0.137)	−0.014 (0.126)	−0.027 (0.050)	0.131 (0.127)	0.109 (0.112)	−0.053 (0.058)
19	0.218*** (0.056)	0.203*** (0.065)	−0.077 (0.048)	0.323*** (0.055)	0.314*** (0.057)	−0.029 (0.054)
20	0.157 (0.116)	0.030 (0.115)	0.045 (0.054)	0.263** (0.111)	0.141 (0.108)	0.002 (0.088)
State unemployment rate	0.002 (0.024)	0.001 (0.022)	−0.010 (0.011)	0.007 (0.023)	0.007 (0.022)	−0.002 (0.013)
Income per capita	−0.079*** (0.024)	−0.075*** (0.020)	−0.004 (0.008)	−0.010 (0.042)	−0.006 (0.030)	0.011 (0.023)
Beer tax	−1.253*** (0.421)	−1.040** (0.388)	0.009 (0.247)	−0.666 (0.737)	−0.363 (0.739)	0.440 (0.397)
State has .08 BAC law	−0.160* (0.087)	−0.155* (0.078)	0.056 (0.046)	−0.119 (0.101)	−0.136 (0.089)	0.091** (0.045)
Zero-tolerance law	−0.142* (0.083)	−0.151** (0.068)	−0.010 (0.057)	−0.007 (0.084)	−0.039 (0.067)	0.011 (0.058)
Seat belt law	0.022 (0.112)	0.047 (0.107)	−0.031 (0.059)	−0.018 (0.113)	0.001 (0.100)	−0.034 (0.061)
Graduated driver licensing	−0.090 (0.112)	−0.101 (0.100)	−0.020 (0.044)	−0.011 (0.143)	0.000 (0.127)	−0.014 (0.056)
Total vehicle miles traveled (in 000s)	−0.003 (0.002)	−0.002 (0.002)	0.001 (0.001)	−0.008*** (0.003)	−0.006** (0.002)	0.006 (0.004)
With state trends	No	No	No	Yes	Yes	Yes
R-squared	0.785	0.748	0.402	0.831	0.796	0.438

All regressions include state fixed effects and year dummies although coefficients are suppressed. Standard errors clustered by state.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

to increased community support for and a court finding of social host liability for serving to minors. I first consider this possibility in Fig. 3a–c. The figures graph the trends in traffic fatality rates separately for states that never have SHLM in the sample and those that have SHLM at some point in the sample.

Fig. 3a graphs the trends for all traffic fatalities; there is little difference between the two series. Fig. 3b and c, the trends for alcohol-related and drunk driver traffic fatalities, suggest a possible endogeneity problem in Table 2. States that experience higher alcohol-related fatalities in the early years of the sample are more likely to enact SHLM. These initially high years may lead to spurious findings of an effect of SHLM. Moreover, Fig. 3d, the trends for sober traffic fatality rates, does not show this separation at the early part of the sample.

To explore the possibility that higher alcohol-related fatalities in the early period may affect the results, I consider a few robustness checks. First, in Table 4, I estimate the previous regressions using data from 1982 onwards. Beginning in 1982, the aggregate trends in fatality rates are similar for states that will and will not enact SHLM. The estimates without state-specific trends are similar to the estimates with trends in the full sample (Table 3).[7] Adding state-specific trends to the shorter sample eliminates the negative correlation of SHLM and traffic fatalities involving alcohol. However, the negative estimate for traffic fatalities among 18–20 years olds involving a drunk driver continue to suggest that SHLM reduce fatalities involving a drunk driver. The magnitude of the estimate is smaller than that from the full sample, although still economically significant. In the shorter sample, SHLM reduces the traffic fatality rate from accidents involving a drunk driver by 9%.[8]

To observe whether public opinion shifted in the years prior to the court's ruling or legislative change, I estimate regressions as in

[7] These results are robust to other specifications than the log-odds estimation presented here, including OLS with and without weights and semi-log estimates.
[8] Results are similar excluding California. California is unusual in that several localities have passed SHLM although the state has not (and is coded as not having SHLM).

Table 4
Multivariate regression of traffic fatalities on alcohol laws and control variables, 1982–2005.

	Logged odds ratio of traffic fatalities					
	(1) Drinking	(2) Drunk driver	(3) Sober	(4) Drinking	(5) Drunk driver	(6) Sober
SHLM	−0.190*** (0.063)	−0.229*** (0.054)	−0.028 (0.053)	−0.067 (0.053)	−0.091* (0.046)	0.005 (0.062)
Minimum legal drinking age is:						
18	−0.003 (0.137)	0.078 (0.115)	−0.003 (0.053)	0.168 (0.123)	0.121 (0.115)	−0.043 (0.061)
19	0.114* (0.063)	0.113* (0.066)	−0.110** (0.047)	0.129* (0.068)	0.123 (0.075)	−0.101* (0.059)
20	0.179 (0.145)	−0.022 (0.119)	0.069 (0.070)	0.270** (0.112)	0.176 (0.114)	0.028 (0.078)
State unemployment rate	−0.015 (0.025)	−0.015 (0.023)	−0.015 (0.010)	−0.043* (0.025)	−0.037 (0.026)	−0.007 (0.013)
Income per capita	−0.030 (0.019)	−0.033** (0.016)	−0.008 (0.010)	−0.061** (0.025)	−0.054* (0.028)	−0.005 (0.028)
Beer tax	−0.003 (0.949)	−0.268 (0.897)	−0.062 (0.310)	0.581 (0.933)	0.525 (0.899)	0.032 (0.699)
State has .08 BAC law	−0.073 (0.084)	−0.076 (0.080)	0.083* (0.049)	−0.093 (0.078)	−0.101 (0.077)	0.091* (0.046)
Zero-tolerance law	−0.076 (0.076)	−0.105 (0.065)	0.006 (0.062)	−0.050 (0.073)	−0.077 (0.058)	0.008 (0.061)
Seat belt law	0.021 (0.080)	0.018 (0.075)	−0.039 (0.057)	−0.025 (0.084)	−0.017 (0.075)	−0.022 (0.060)
Graduated driver licensing	−0.059 (0.101)	−0.061 (0.094)	−0.015 (0.045)	−0.007 (0.110)	0.004 (0.103)	0.002 (0.066)
Total vehicle miles traveled (in 000s)	−0.003*** (0.001)	−0.003*** (0.001)	0.000 (0.001)	0.003 (0.004)	0.003 (0.005)	0.004 (0.004)
With state trends	No	No	No	Yes	Yes	Yes
R-squared	0.763	0.742	0.420	0.815	0.789	0.454

All regressions include state fixed effects and year dummies although coefficients are suppressed. Standard errors clustered by state.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 5
Multivariate regression of traffic fatalities on leads and lags of SHLM, 1982–2005.

	Logged odds ratio of traffic fatalities					
	(1) Drinking	(2) Drunk driver	(3) Sober	(4) Drinking	(5) Drunk driver	(6) Sober
5–6 years before	−0.068 (0.104)	−0.030 (0.091)	0.110 (0.073)	0.074 (0.090)	0.115 (0.081)	0.157* (0.086)
3–4 years before	−0.099 (0.157)	−0.116 (0.133)	0.045 (0.073)	0.045 (0.074)	0.065 (0.072)	0.054 (0.090)
1–2 years before	−0.171 (0.172)	−0.199 (0.141)	−0.014 (0.075)	0.013 (0.095)	0.021 (0.083)	0.039 (0.084)
Year of SHLM	−0.265 (0.199)	−0.319* (0.170)	−0.017 (0.087)	−0.056 (0.112)	−0.070 (0.102)	0.030 (0.116)
1–2 years after	−0.302 (0.188)	−0.324** (0.159)	0.031 (0.094)	−0.069 (0.091)	−0.054 (0.083)	0.079 (0.120)
3–4 years after	−0.301 (0.204)	−0.378** (0.164)	0.112 (0.078)	−0.035 (0.119)	−0.068 (0.115)	0.187 (0.124)
5–6 years after	−0.248 (0.166)	−0.314** (0.129)	0.042 (0.104)	0.069 (0.169)	0.047 (0.182)	0.154 (0.130)
7 or more years after	−0.140* (0.076)	−0.103 (0.078)	−0.003 (0.068)	−0.092 (0.073)	−0.062 (0.070)	−0.009 (0.071)
With state trends	No	No	No	Yes	Yes	Yes
R-squared	0.752	0.732	0.414	0.811	0.785	0.455

All regressions include state fixed effects and year dummies although coefficients are suppressed. Standard errors clustered by state.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 4 but using a series of variables indicating the years before and the years after acceptance of SHLM. I include indicator variables for 5–6 years prior to SHLM, 3–4 years prior, and 1–2 years prior, the year of, 1–2 years after, and 3–4 years after, 5–6 years after, and 7 or more years after. The omitted category is 7 or more years before the SHLM. Table 5 presents the estimates; Fig. 4a and b graphs the estimated coefficients.

First, I consider the estimates without state trends. In the alcohol-related and drunk driving regressions, we observe declines in traffic fatalities in the years preceding SHLM. Traffic fatalities decline even further the year of and the years following the SHLM, increasing again after about 6 years. Sober traffic fatalities were high several years prior to SHLM; however, in this regression, the SHLM coefficients are not jointly significant. For the estimates with state trends, the pattern differs. Coefficients for all three fatalities series appear similar prior to SHLM. At the year of SHLM, drinking-involved and drunk-driving accidents fall and stay lower for about 4 years.

The pattern of estimates is consistent with the estimates in Tables 3 and 4: the estimates are more negative in the year of and the years after SHLM than in the years before. SHLM reduced alcohol-related traffic fatalities in an economically important way, resulting in declines of about 5–7% for a handful of years.

Police may be less willing to note the involvement of alcohol when a state has a SHLM. If so, enactment of SHLM may coincide with reduction in police reporting of alcohol involvement in fatal accidents. Most alcohol-involved accidents occur at night. Nighttime fatality rates are highly correlated with alcohol-involved fatality rates ($\rho = 0.7483$) and drunk-driving fatality rates ($\rho = 0.7243$). To avoid confounding effects from changes in police reporting, I compare the effects of SHLM on nighttime and daytime accident rates.[9]

Table 6 presents these estimates for the full sample, 1977–2005. Without state-specific trends, SHLM reduces nighttime fatalities by 8.6%. At the 10% level, the estimated effect of SHLM on nighttime fatalities is statistically smaller than its effect on daytime fatalities. Columns (3) and (4) add state trends. Although the estimated effect on nighttime fatalities is no longer statistically different from zero, it is statistically smaller than the estimated effect on daytime fatalities. Columns (5) through (8) in Table 6 present estimates for the shorter sample period, 1982–2005. In the estimates without state trends, SHLM reduced nighttime fatalities by a statistically significant 5%. However, this is not statistically different from its

[9] I thank an anonymous reviewer for suggesting this strategy.

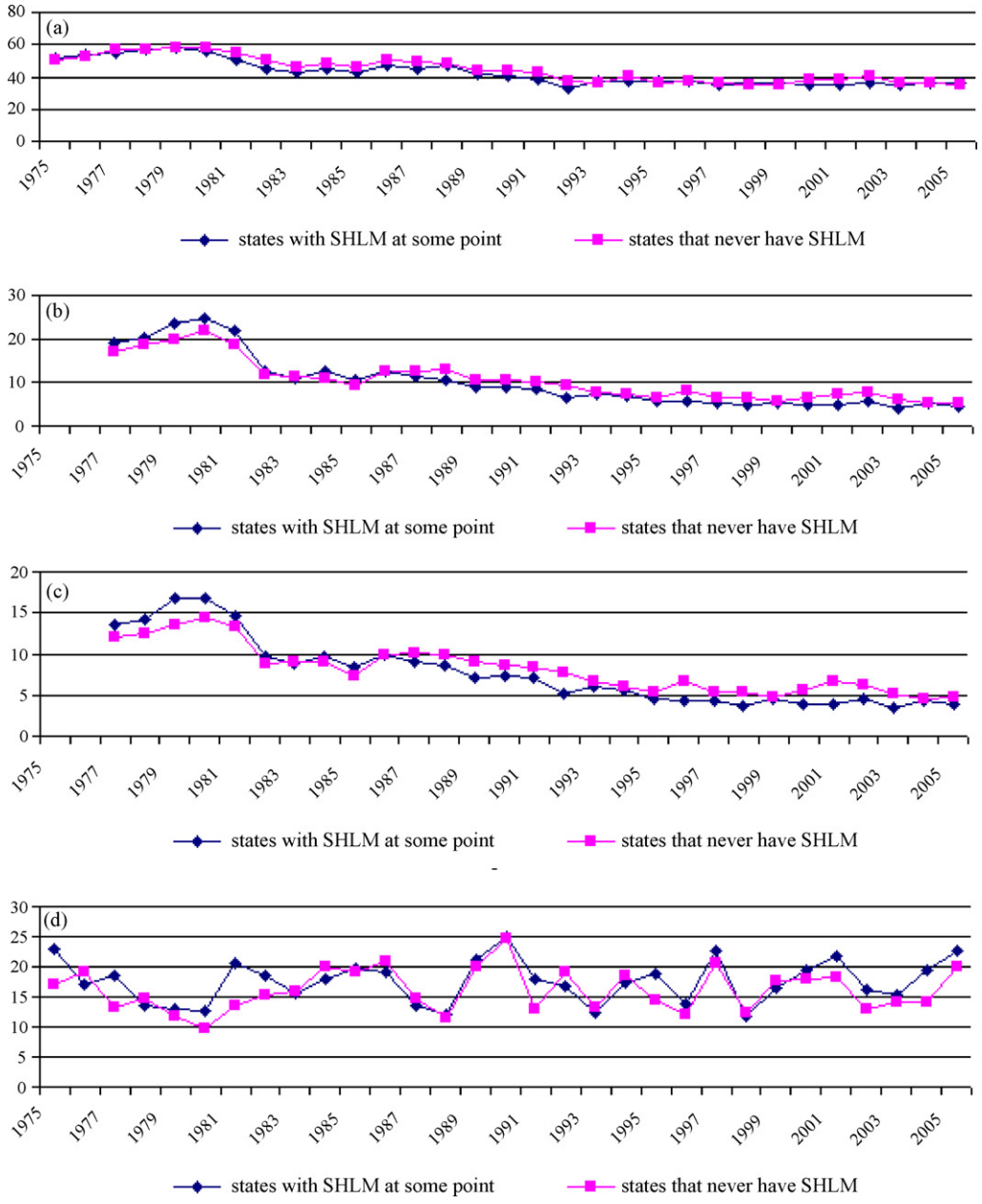

Fig. 3. (a) Traffic fatality rates by SHLM, (b) traffic fatality rates involving alcohol by SHLM, (c) traffic fatality rates involving drunk drivers by SHLM, and (d) traffic fatality rates not involving alcohol by SHL.

Table 6
Multivariate regression of traffic fatalities by time of accident on alcohol laws and control variables.

	Logged odds ratio of traffic fatalities							
	(1) Night	(2) Day	(3) Night	(4) Day	(5) Night	(6) Day	(7) Night	(8) Day
SHLM	−0.086*** (0.026)	−0.037 (0.028)	−0.038 (0.026)	0.014 (0.027)	−0.050** (0.025)	−0.037 (0.028)	−0.036 (0.022)	0.026 (0.023)
Dates covered	1977–2005				1982–2005			
State trends?	No	No	Yes	Yes	No	No	Yes	Yes
R-squared	0.844	0.800	0.873	0.840	0.818	0.797	0.845	0.834

All regressions include state fixed effects and year dummies although coefficients are suppressed. Standard errors clustered by state.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

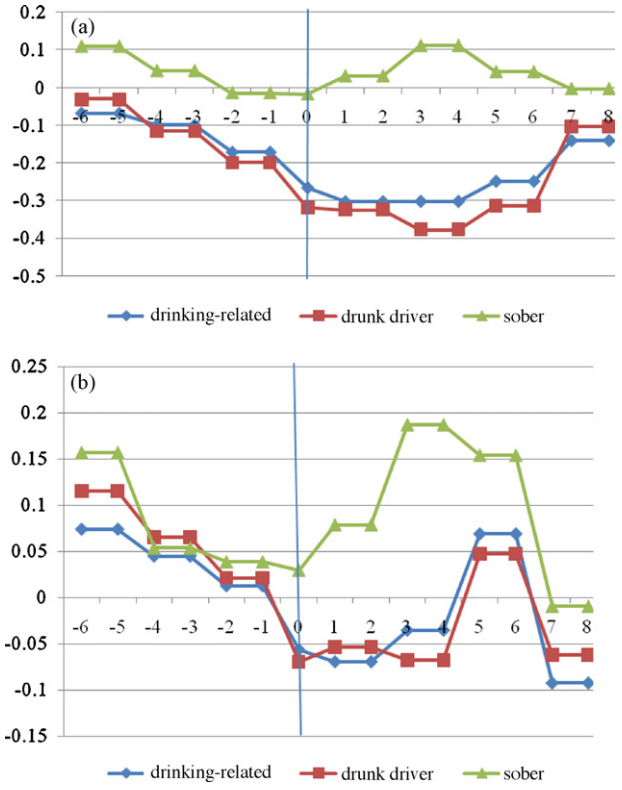

Fig. 4. (a) Timing of effect of SHLM and (b) timing of effect of SHLM, including state trends in model.

estimated effect on the daytime fatality rate. Columns (7) and (8) include state-specific trends. At the 5% level, the estimated effect of SHLM on nighttime fatality rates is statistically smaller that the effect on daytime fatality rates. SHLM reduces nighttime fatality rates more than daytime fatality rates. This evidence is consistent with the earlier estimates demonstrating that SHLM reduced drunk-driving accident fatalities.

5. Effects of SHLM on alcohol consumption and drunk driving

The estimates above imply that SHLM reduce drunk-driving traffic fatalities by between 5 and 9%. This is large relative to the effects of other alcohol-related policies. Previous studies estimate the effect on drunk-driving traffic fatalities of raising the minimum legal drinking age from 18 to 21 at 10% (Dee, 1999) and of lowering the legal BAC to 0.08 law at 3.1% (Eisenberg, 2003).[10] The magnitude of the estimated effect of SHLM calls for further investigation.

SHLM can affect drunk-driving traffic fatalities in two manners: reducing the amount of alcohol consumed or reducing the probability of driving after consuming alcohol. To disentangle these two effects, I consider survey data on current alcohol consumption, binge drinking, and drunk driving from the Behavioral Risk Factor Surveillance System (BRFSS). Begun in 1984, the BRFSS surveys more than 350,000 adults, by telephone, on the type and extent to which they participate in various risky behaviors. I concentrate on the sample of 18–20 year olds from 1984 to 2004.[11]

As reported in Table 7, 47% report drinking alcohol and 23.7% report drinking 5 or more drinks in a row, "binge drinking". The

Table 7
BRFSS: drinking and drunk driving among 18–20 year olds.

				Percent of 18–20 years olds
Panel A: Prevalence of drinking				
Drank alcohol in past 30 days				48%
Binge drank in past 30 days				24%
Drove after drinking past 30 days				4%
	People	Percent of drunk drivers	Incidents	Fraction of incidents
Panel B: Drunk drivers past 30 days				
One incident	1116	51.9%	1116	20.2%
Two incidents	510	23.7%	1020	18.5%
3–5 incidents	339	15.8%	1302	23.6%
6–10 incidents	133	6.2%	1015	18.4%
11–20 incidents	35	1.6%	525	9.5%
21+ incidents	19	0.9%	547	9.9%
Total	2152	100%	5525	100%

BRFSS also asks "During the past 30 days, how many times have you driven when you've had perhaps too much to drink?" I code responses into a variable indicating any drinking and driving in the past 30 days and a variable counting the number of times the respondent drove drunk. 4.1% report drunk driving in the past 30 days. Of those admitting any drunk driving, 48% report only one occasion in the past 30 days.

Most of those admitting to drunk driving in the past 30 days also report binge drinking in the past 30 days. Only 10% of the drunk drivers report not having five or more drinks in a row in the past 30 days. The 2152 drunk drivers in the sample admit to driving after drinking 5525 times in the past 30 days. Most incidents of drunk-driving stem from a small group of repeat offenders. Less than 3% of drunk drivers are responsible for 20% of the incidents of drunk driving.

Table 8 presents estimates of the relationship between SHLM and self-reported measures of drinking, binge drinking, and drunk driving. All regressions include individual-level indicator variables for sex, black, race not identified as white or black, Hispanic, age, marital status and education. State-level controls include indicator variables for whether the minimum legal drinking age is 18, 19, or 20; the unemployment rate; per capita income; beer tax; whether the state legal BAC is 0.08; whether the state has a zero-tolerance law; whether the state has graduated driver licensing; and vehicle miles traveled. All regressions also include year dummies and state fixed effects.[12] The odd numbered columns present estimates without state-specific trends; the even numbered columns with state-specific trends.

SHLM may have reduced alcohol consumption. In estimates without state trends, SHLM reduces the probability of current consumption and the probability of binge drinking by about 3 percentage points. Including state-specific trends results in an estimated effect on current alcohol consumption that is small and not statistically significant. Drinking is declining during this period; SHLM simply reflect that trend. With or without state trends, SHLM reduces binge drinking by about 3 percentage points; the estimate is not statistically significant once state trends are included.

SHLM reduces drunk driving. Columns (5) and (6) estimate the effect of SHLM on whether the respondent ever drove drunk in the

[10] Miron and Tetelbaum (2009), however, contest Dee (1999) and find no effect of minimum legal drinking ages.

[11] The survey did not ask questions about drunk driving in 2001, 2003, or 2005. I omit these years.

[12] Estimates are weighted using BRFSS final sample weights. Unweighted estimates are similar. In the first six columns, the dependent variable is a dummy variable. Estimates using a logit are qualitatively similar. In the last two columns, the dependent variable is a count variable. Estimates using a Poisson or a negative binomial are similarly large, although not statistically significant at conventional levels.

Table 8
BRFSS regressions of alcohol consumption and drunk driving on SHLM.

	Drank past 30 days?		Drank ≥5 drinks in a row last 30 days?		Drove drunk last 30 days?		Number of times drove drunk last 30 days?	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SHLM	−0.0329*	−0.0146	−0.0335**	−0.0309	−0.00844	−0.0173	−0.0506	−0.0906*
	(0.0182)	(0.0201)	(0.0146)	(0.0250)	(0.00916)	(0.0143)	(0.0388)	(0.0539)
State trends?	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.085	0.087	0.106	0.108	0.037	0.039	0.021	0.023

All regressions include individual-level indicator variables for sex, black, race not identified as white or black, Hispanic, age, marital status and education. State-level controls include indicator variables for whether the minimum legal drinking age is 18, 19, or 20; the unemployment rate; per capita income, beer tax, whether the state legal BAC is 0.08; whether the state has a zero-tolerance law; whether the state has a graduated driver licensing; and vehicle miles traveled. Regressions include year dummies and state fixed effects. Standard errors clustered by state. Observations weighted using BRFSS final weights. $N = 52{,}168$.

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

past 30 days. The estimated effects are large relative to the small fraction of people who drive drunk: SHLM reduced the propensity to drive drunk by 1.7 percentage points when only 4.1% of people drink and drive. However, the effect is not statistically significant. The final columns of the table examine whether SHLM reduced how *frequently* the respondent drives drunk. On average, 18–20 year olds drove drunk 0.10 times in the past 30 days. SHLM reduced the frequency of drunk-driving incidents by 0.09. SHLM particularly appears to reduce the frequency of repeat offenders' drunk driving.

6. Conclusions

Social host laws for minors aim to reduce adults' hosting of parties involving alcohol for teenagers by finding these adults liable for accidents stemming from the access to alcohol. Some parents of teens host parties for safety reasons, preferring their teens and their teens' friends to drink in a supervised and safe locale. Both arguments imply an effect of social host liability for minors on alcohol-related traffic fatality rates for under-aged drinkers; the signs of the implied effects, however, differ.

Parties are important sources of alcohol for underage drinkers. When asked where they were the last time they had 5 or more drinks in a row, 32% of 18–20 year olds reported that they were in their own home; an additional 51% reported that they were at another person's home.[13] 70% report obtaining the alcohol they drank from someone else; only 20% report buying the alcohol themselves.[14]

I find that, among 18–20 year olds, social host liability for minors (SHLM) reduced the drunk-driving fatality rate. This effect is net of other alcohol-related state-level policies, state fixed effects, state-specific trends, and year dummies. Endogeneity could arise from states finding social host liability for minors after a spate of alcohol-related teen fatalities. However, the data exhibit no pre-law spike in alcohol-related teen fatalities. The magnitudes of the estimates suggest that SHLM reduced drunk-driving fatalities by about 9%, an economically important and statistically significant effect.

Survey evidence confirms that SHLM reduced drunk driving. Most of the effect appears to stem, not from reducing alcohol consumption, but rather from reducing driving after drinking. Although advocates for SHLM may hope to reduce teenage drinking, the estimates suggest only modest, if any, effect on current alcohol consumption or binge drinking. Social host laws appear to induce the adults supervising alcohol consumption to pressure underage drinkers not to drive. The effects are most notable among those drunk drivers prone to be repeat offenders.

[13] Author's calculations from the BRFSS in 2003 and 2004, the only years this question was asked. The other options were at a restaurant or banquet hall; at a bar or club; at a public place, such as at a park, concert, or sporting event; and other.

[14] This is consistent with evidence from other surveys. Most teenagers obtain alcohol from friends or acquaintances that are over 21 either directly or at parties (Fabian et al., 2008; Wagenaar et al., 1993,1996; Jones-Webb et al., 1997). Among twelfth graders, most drinkers report obtaining alcohol at parties and from friends (Harrison et al., 2000).

Acknowledgements

I thank Jeff Miron and Elina Tetelbaum for generously providing me with their data, Kitt Carpenter for providing data on the zero-tolerance laws, and MADD for providing the summary of court decisions related to social host liability. Thank you to Janice Hauge for a discussion provoking my interest in the topic. I am also grateful to Jeff Desimone, Sean Mulholland, and an anonymous reviewer for their useful suggestions and comments. Any remaining errors are my own.

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