



Wine distribution laws, alcohol consumption, and traffic fatalities in the United States

Brad Rickard (contact author)

Charles H. Dyson School of Applied Economics and Management
Cornell University, Ithaca, New York, USA

E-mail: bjr83@cornell.edu; Phone: +1.607.255.7417

Teevrat Garg

Cornell University, Ithaca, New York, USA

Marco Costanigro

Colorado State University, Fort Collins, Colorado, USA

Abstract.

Purpose: The repeal of the Prohibition Act in 1933 introduced many state-specific regulations in wine markets. As one example of this, fifteen states currently have laws that restrict wine sales in grocery stores, and some states have recently considered lifting these restrictions. Here we examine the effects of introducing wine into grocery stores on traffic fatalities, a social problem often associated with alcohol consumption.

Approach: Our analysis employs a 3SLS econometric model using panel data to consider the effects of wider distribution of wine on consumption of wine, beer, and spirits. ***Findings:*** We find that the introduction of wine into grocery stores reduces wine prices by 7% and increases wine consumption by 22%. Furthermore, we find that wine consumption as a share of total alcohol consumption has a negative effect on total traffic fatalities (beer and spirit effects as a share of total alcohol consumption are positive), and the effects are even stronger for youth traffic fatalities.

Practical Implications: Several states have proposed changes that would expand the distribution of wine; however, the proposals have met significant resistance from liquor store owners who would clearly be negatively affected. In addition, social interest groups are

concerned that the introduction of wine into grocery stores would increase alcohol consumption and increase various social problems.

Findings: *suggest that wider distribution of wine would not lead to an increase in traffic fatalities and may even decrease traffic fatalities given the substitution effects between beer, wine, and spirits.*

Keywords: Alcohol consumption; Demand analysis; Traffic fatalities; Policy reform; Wine.

1. INTRODUCTION

The repeal of the Prohibition Act in the United States in 1933 introduced many state-specific regulations in wine markets. These regulations were initially designed to reduce the acute and chronic social problems associated with alcohol consumption; now it is believed that many of these regulations continue to exist for historical reasons and because of rent-seeking behavior. As one example of this, fifteen states currently have laws that restrict wine sales in grocery stores (including all outlets that sell food such as supermarkets, convenience stores, and pharmacies). Beer is sold in grocery stores in most states, even in those states that do not distribute wine in grocery stores, while spirits are not available in grocery stores if wine is not available in grocery stores.

Proposals to allow wine sales in grocery stores have recently been initiated in Colorado, Delaware, Kentucky, Massachusetts, New York State, Oklahoma, and Tennessee. Furthermore, in many states such proposals have resurfaced several times beginning in the 1960s (e.g., New York State Moreland Commission, 1964). However, none of these recent proposals have become legislation and they continue to meet significant resistance from liquor store owners who would clearly be negatively affected by such a policy change (see Rickard 2011). They also face resistance from social interest groups concerned that the introduction of wine into grocery stores would increase alcohol consumption and increase the various problems associated with alcohol.

Figure 1 shows the average per capita consumption rates of wine between 1970 and 2007 for three groupings of states (NIH-NIAAA, 2009). The first group consists of states that allowed wine to be sold in grocery stores over this time period (twenty-eight states plus Washington, D.C.), the second group includes eight states that introduced wine into grocery stores between 1969 and 1985, and the third group is comprised of the fifteen states that did not allow wine to be sold in grocery stores. Figure 1 shows that the second group, the group of eight states that introduced wine into grocery stores between 1969 and 1985 had the smallest per capita consumption rate in 1970 and the highest rate in 2007. In addition, the group that did not allow wine to be sold in grocery stores had the lowest average per capita consumption rate of wine between 1985 and 2007. In 2007 the per capita consumption rate of wine in the second group was approximately 20% higher than that in the third group.

The information in Figure 1 and other evidence in the literature (e.g., McDonald 1986; Smart 1986; Adrian et al., 1996; Her et al., 1999) suggest that the introduction of wine into grocery stores will increase wine consumption. The primary objective of this paper is to estimate the impact that the introduction of wine into grocery stores would have on alcohol prices, alcohol consumption, and traffic fatalities. There are several papers that examine the individual links in our analysis, but here we extend previous work by developing a bridge between policy change, alcohol consumption, and traffic fatalities, considering three types of alcohol. Furthermore, we examine a policy issue that has been proposed in many states in recent years, and is expected to reappear in the near future.

2. LITERATURE REVIEW

There is a large literature that examines impacts of alcohol regulations in the United States. Much of this work separates alcohol regulations into those that are associated with acute social problems (e.g., motor accidents) and those associated with chronic social problems (e.g., liver cirrhosis, pancreatitis, and specific types of cancer). Furthermore, alcohol policies can be divided into those designed to control alcohol consumption and those designed to curb the problems caused by excessive alcohol consumption. Both types of policies have been

studies by economists and the relative efficiencies of each are widely debated (see Chaloupka et al., 1993; Kenkel 1993; Ruhm 1996; Baughman et al., 2001; Wagenaar, Tobler, Komro, 2010).

The minimum drinking age (MDA), limitations on keg purchases, Sunday sale restrictions, and various alcohol taxes are designed to decrease the incentive to consume alcohol. Substantial fines and license penalties for driving under the influence (DUI), and random roadside tests of blood alcohol content are policies aimed at reducing problems associated with alcohol. In the United States we see a combination of policies with the objective of reducing one or both types of social problems associated with alcohol.

The literature contains a number of articles that use a reduced form econometric approach to estimate the effects of particular policies on traffic fatalities (e.g., Ruhm 1996; Mann et al., 2006). Due to considerations about endogeneity, others have employed structural models that more carefully track the links between alcohol prices, alcohol consumption, and traffic fatalities (e.g., Young and Bielinska-Kwapisz, 2006). Studies in this group use instruments for prices in the estimation of demand for alcohol. Most of this research examines how alcohol policies affect fatalities or how policies affect demand for alcohol, and the policy focus has been on the role of taxes, DUI laws, and the MDA. We extend these analyses in two important ways. First, we disaggregate alcohol consumption into consumption of beer, wine, and spirits to isolate the effects of selected policies on consumption rates for the three types of alcohol. Second, we include wine availability in our structural model to examine its influence on the consumption of all three alcohol types.

To really understand the effects of alcohol policies on alcohol consumption and the social problems associated with alcohol, we would need long term longitudinal data. Because these type of data are not available, we follow what others have done in this arena and use state-level data across time to measure the impact of policies on alcohol consumption and traffic fatalities. We expect that states with high alcohol consumption will have more traffic fatalities, and in particular, we expect that states with high consumption rates of beer and spirits will have higher rates of traffic fatalities.

3. APPROACH

Our analysis uses panel data across 48 states between 1982 and 2004 in a 3SLS econometric model. The second stage in our model estimates the effects of price, income, wine availability, several exogenous demographic variables, and policy variables that influence alcohol consumption on the demand for beer, wine, and spirits. We estimate the effects in a demand system that employs the Rotterdam model. Because of the likely endogeneity issues associated with using price as an explanatory variable in the demand estimation, the first stage in our model employs various alcohol taxes as instruments (plus all exogenous variables included in the demand estimations) to estimate prices of beer, wine, and spirits (following Young and Bielinska-Kwapisz, 2002; 2003; 2006). The third stage then uses fitted values from stage two for the demand of beer, wine, and spirits in a model that estimates traffic fatalities. Six classes of traffic fatalities are estimated as a function of alcohol demand and various policy parameters that influence driving behavior.

We collect data across a wide range of sources. Alcohol price data is collected from ACCRA (2010), which documents time-series city-level prices for a standard beer, wine, and spirit product; we aggregate city-level data to create state-level price data for the three types of alcohol. State-level per capita alcohol consumption data is available from NIH-NIAAA (2009) and state-level traffic fatality information was collected from U.S. Department of Transportation (2010). Data between 1982 and 2000 describing demographic and policy

information was borrowed from Young and Bielinska-Kwapisz (2006) and was subsequently updated here. State-level wine availability data was taken from Wine Institute (2009).

4. RESULTS

Regression results in each stage lead to important findings that contribute to the literature studying the economics of traffic fatalities and to a better understanding of a real-world contemporary economic policy issue in the United States. Overall, our results shed some new—and at first, perhaps, surprising—light on the likely effects of wider distribution of wine in the United States.

Table 1: Regression Results for Variables Affecting Alcohol Consumption

Variable	ln_beerQ	ln_wineQ	ln_liquorQ
ln_beerprice	-1.66**	-1.25	2.3
ln_wineprice	.261	.457	-4.29**
ln_spiritprice	-.367	.15	2.36*
ln_income	-.58***	1.42***	-.78**
WIGS	.0253	.221**	-.256*
unemployment	-.0104*	.0274**	-.00072
tourism	.0318***	.0714***	.0542***
pop_18to29	-.00607	.0356	.159***
pop_65	-.0192**	-.0545***	.0211
catholic	-.00013	.0118***	.00361
mormon	-.00668***	-.0046	-.0208***
southern_baptist	-.00111	-.00735***	-.0048
dry county	-.00305***	-.00595***	-.00535*
constant	12.7***	-2.37	-5.56

Note: * p<0.05; ** p<0.01; *** p<0.001

We find that introducing wine into grocery stores reduces the price of wine by 7% and reduces the price of beer by 5%; there is no statistically significant price effect for spirits. Results from the second stage are shown above in Table 1. Here we see a negative income effect for beer and spirit consumption, but a positive income effect for wine. We also see that the introduction of wine into grocery stores increases wine consumption by 22.1% and decreases spirit consumption by 25.6%. Introducing wine into grocery stores does not have a statistically significant impact on beer consumption, and this may be due to two opposing market effects. First, the introduction of wine into grocery stores competes with beer and may decrease beer sales; however, introducing wine into grocery stores also decreases beer prices and this will have a positive impact on beer consumption. Table 1 also shows that tourism (measured as the annual number of visitors in a state) has a positive impact on consumption of all alcohol while consumption of specific alcohols falls with certain demographic groups and in dry counties.

Table 2 summarizes the regression results from the third stage in our econometric model. Here we show the effects of alcohol consumption and various policy parameters on six types of traffic fatalities. The U.S. Department of Transportation (2010) provides data on total fatalities, youth fatalities (for fatality victims aged 16 to 20), weekend fatalities, and combinations of these groupings. Results across all six columns show that increases in total alcohol consumption increase traffic fatalities. More specific results show that increases in beer and spirit consumption as a share of total alcohol consumption increase traffic fatalities, and an increase in wine consumption as a share of total alcohol consumption decreases traffic fatalities. Previous work has also found a positive relationship between beer consumption and traffic fatalities (Ruhm, 1996; Mann et al., 2006). There are several possible explanations for the finding, but we expect it is related to where the different alcohols are consumed and whether they are consumed with food. The legal index variable is a composite of six policies that were implemented to discourage drunken driving, and regression results show a negative and statistically significant effect on this variable in five of the six columns.

Table 2: Fatality Rate Regression Results

Variable	total	total1620	weekend_total	weekend_1620	othertotal	other1620
ln_beerQ	.125***	.196***	.036***	.0759***	.0594***	.0765***
ln_wineQ	-.0722***	-.123***	-.0196***	-.0447***	-.0394***	-.0539***
ln_liquorQ	.0163***	.0188*	.00472***	.00594	.00748***	.00873*
drinkage18	.00725	.00942	.00536*	.0208**	.00022	-.017*
drinkage19	.0171*	.05*	.00587**	.0185**	.00562	.011
drinkage20	-.00844	-.00744	-.00249	-.00092	-.00235	-.00318
legal_index	-.0184***	-.0335***	-.00562***	-.013***	-.00723***	-.0113
vmtlic	.00896***	.0181***	.00112***	.00297***	.00608***	.0125***
seatbelt	-.0194***	-.0523***	-.00531***	-.0226***	-.00984***	-.0213***
illperse08	-.0222***	-.0362**	-.00949***	-.0267***	-.00665**	-.0022
keg_reg	-.00395	.00315	-.00145	.00353	-.00015	-.00047
youthbac	-.00726	-.0426***	-.00448***	-.025***	.00051	-.00901*
servtran	-.00782*	-.0136	-.00215*	-.0096*	-.00329	.00056
Constant	.0181	.0898***	.0195***	.0775***	-.021***	-.0484

Note: * p<0.05; ** p<0.01; *** p<0.001

Our results indicate that introducing wine into grocery stores will have important impacts in the markets for beer, wine, and spirits. Given the substitution effects between beer, wine, and spirits, an increase in wine consumption and decreases in the consumption of beer and spirits have the capacity to decrease traffic fatalities. Furthermore, this general result is stronger in the regressions that focus on youth traffic fatalities.

5. INDUSTRY AND POLICY IMPLICATIONS

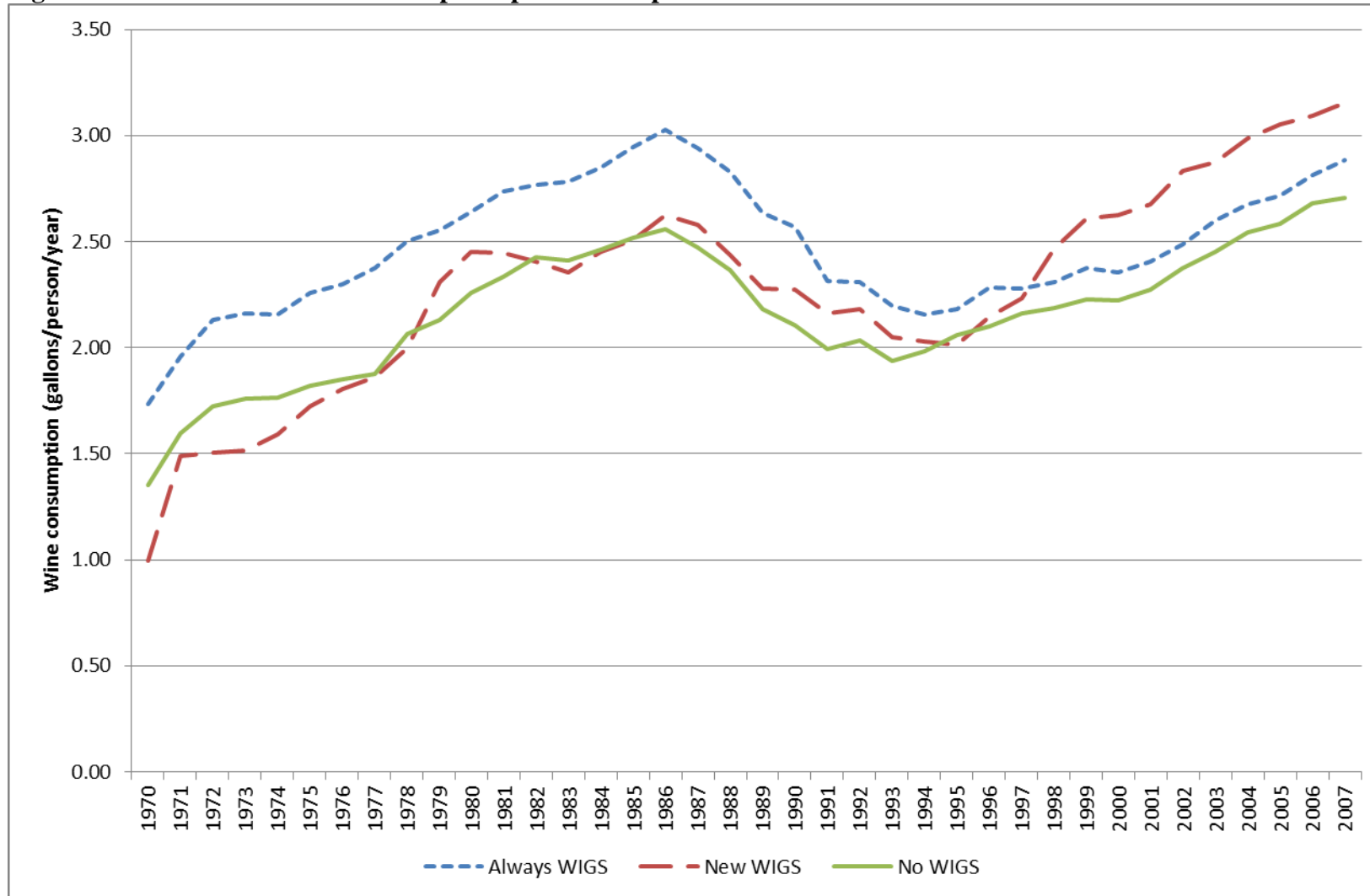
Recently there has been a renewed interest to expand wine distribution beyond liquor stores and into grocery stores in several states. Proposals put forward have been viewed as a vehicle for state governments to raise additional revenue through sales taxes, excise taxes, annual license fees, and franchise fees (one-time entrance fees charged to grocery stores), yet there has been strong opposition towards these proposals from liquor store owners and social interest groups.

Our analysis yields three interesting findings. First, we find that introducing wine into grocery stores decreases the price of wine by 7%. Second, it increases the consumption of wine by 22%. Third, our results indicate that the introduction of wine into grocery stores will not likely lead to an increase in the number of traffic fatalities, a social problem that is commonly associated with alcohol consumption, and such a policy change may even have the capacity to decrease overall traffic fatalities in the United States. We find that an increase in beer and liquor consumption as a share of total alcohol consumption would increase traffic fatalities (a 100% increase in beer consumption increases total traffic fatalities by 0.125 persons per thousand per year), and increases in wine consumption as a share of total alcohol consumption would decrease total traffic fatalities. When we look at weekend traffic fatalities, the time when many fatalities are thought to be caused by alcohol use, we find that a 100% increase in wine consumption would decrease fatalities by 0.036 persons per thousand per year.

There is no research that examines the impact of introducing wine into grocery stores on traffic fatalities, and there is limited work that estimates the social costs of alcohol consumption for different types of alcohol. Our study begins to redress both of these issues and weighs in on the current debate regarding the social costs of increased wine distribution in the United States. This is an issue that has far-reaching implications for wine producers across the United States, as well as producers in Europe, Australia, and South America.

Our research also sheds some new light on the tradeoffs that various stakeholders face as they debate the economic consequences of introducing wine into grocery stores. Retailers in New York State have long supported such a policy change while liquor store owners have strongly resisted any changes in legislation. This support by retailers indicates that the revenue implications from wine sales will outweigh any loss in revenue from beer sales (given the small decreases in beer prices estimated here). A key point in the debate between retailers and liquor store owners has centered on the issue of access and on the social implications of wider distribution of alcohol. Our research indicates that wider distribution of wine does not necessarily lead to higher social costs, and this suggests that claims supporting this notion as a reason not to introduce wine into grocery stores may be misleading. The opposition to wine-in-grocery-stores legislation—and claims that it will increase traffic fatalities and other social problems—is most likely driven by rent-seeking behavior among liquor store owners that would like to maintain control over wine sales.

Figure 1: Wine distribution laws and per capita consumption rates between 1970 and 2007



Source: NIH-NIAAA, 2009

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