NBER WORKING PAPER SERIES

ALCOHOL ADVERTISING BANS AND ALCOHOL ABUSE: AN INTERNATIONAL PERSPECTIVE

Henry Saffer

Working Paper No. 3052

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 1989

I would like to thank Michael Grossman and Frank Chaloupka for helpful comments on an earlier draft of this paper. This project was supported by a grant from the J.M. Foundation to the National Bureau of Economic Research and by Grant Number NSS 1 S07 RR05995-01 from the Biomedical Research Support Grant Program, Division of Research Resources, NIH, PHS, DHHS to the National Bureau of Economic Research. This paper has not undergone the review accorded official NBER publications; in particular it has not been submitted for approval to the Board of Directors. This paper is part of NBER's research program in Health Economics. Any opinions expressed are those of the author not those of the National Bureau of Economic Research.

NBER Working Paper #3052
July 1989

ALCOHOL ADVERTISING BANS AND ALCOHOL ABUSE: AN INTERNATIONAL PERSPECTIVE

ABSTRACT

The purpose of this paper is to empirically examine the effect on alcohol abuse of banning broadcast advertising of alcoholic beverages. The effect of a ban cannot be studied using data from one country because the adoption of new advertising bans is an infrequent event and requires many years for adjustment. However, an international data set can be used since there is considerable variation in the use of advertising bans across countries. The data used in this study are a pooled time series from 17 countries for the period 1970 to 1983. The empirical measures of alcohol abuse are alcohol consumption, liver cirrhosis mortality rates, and highway fatality rates. The cultural factors which influence alcohol use are measured by sets of country dummy variables. The empirical results show that countries with bans on spirits advertising have about 10 percent lower alcohol consumption and motor vehicle fatality rates than countries with no bans. The results also show that countries with bans on beer and wine advertising have about 23 percent lower alcohol consumption and motor vehicle fatality rates than countries with only bans on spirits advertising.

Henry Saffer
Department of Management Science
Kean College
Union, NJ 07083
and
NBER
269 Mercer St.
New York, NY 10003

I. Introduction

Participants in several recent meetings of the World Health Organization have expressed concern over the worldwide increase in alcohol marketing efforts. The reason for this concern is the presumption that the increase in alcohol marketing efforts will lead to an increase in alcohol consumption and alcohol abuse. Broadcast advertising is a major component of alcohol marketing. According to Cavanagh and Clairmonte (1985) alcohol advertising expenditures in the United States were about one billion dollars in 1980. These expenditures represent about two percent of all advertising expenditures in the United States and about one half of all alcohol advertising in the world. Although expenditures on alcohol advertising are substantial, the effect of this advertising on alcohol abuse remains a controversial subject.

The central issue in the debate over alcohol advertising is whether this advertising affects only brand choice or affects both brand choice and overall alcohol consumption. A number of econometric studies of alcohol advertising expenditures find little or no effect of advertising on total alcohol consumption. Studies of advertising expenditures include Comanor and Wilson (1974), Grabowski (1978), McGuiness (1980), and Ornstein and Levy (1983). Smart (1988) reviews several other studies, including both econometric and experimental studies, and finds little evidence of any effect of alcohol advertising. Simpson et. al. (1985) also review the literature on alcohol advertising and conclude that

there is no evidence of any effect of alcohol advertising on aggregate alcohol demand.

One problem with prior empirical studies of alcohol advertising expenditures is the use of data measuring relatively small variations in alcohol advertising. This type of data may be useful for measuring the effects of alcohol advertising on brand choice but can not be extrapolated to measure the effect of alcohol advertising on total alcohol consumption. An empirical strategy designed to test the determinants of brand choice is not appropriate for problems involving total alcohol consumption since these choices are fundamentally different.

Total alcohol consumption decisions are guided by perceptions of traditionally acceptable patterns of consumption. Traditional patterns of consumption are important because alcohol is an unusual consumer good. Alcohol is unusual in that its consumption has an important and historic role in many social customs, while it is understood to also have potentially adverse health effects. According to Strickland (1983), drinking behavior is learned by observing the behavior of family and peers, and is reenforced by advertising portrayals. The perception of traditionally acceptable patterns of alcohol consumption is a result of accumulated exposure to positive and negative information about alcohol. Changes in current advertising exposure can have only a limited influence on an individual's cumulative information about acceptable usage. Small variations in alcohol advertising expenditures might,

therefore, effect brand choice decisions but not effect total alcohol consumption decisions.

Continuous exposure to alcohol advertising over a long period could influence cumulative information about acceptable usage patterns and thus effect total alcohol consumption. An alcohol advertising ban is an ideal empirical indicator of cumulative information about alcohol. This suggests that a cross sectional or time series study of advertising bans is an appropriate empirical strategy for testing the effect of alcohol advertising on alcohol abuse. Prior studies of alcohol advertising bans include Smart and Cutler (1976) and Ogborne and Smart (1980). These studies examine the effect of advertising bans in British Columbia and Manitoba, respectively. The ban in British Columbia included all alcohol advertising but lasted only one year. The ban in Manitoba included only beer advertising and was analyzed using an eight year time series. Both studies concluded that these advertising bans had no effect on alcohol consumption. Alternatively, these results may indicate that in a single province or country study a long time period is necessary before there is any observable change in alcohol consumption.

The purpose of this paper is to empirically examine the effect on alcohol abuse of banning broadcast advertising of alcoholic beverages. The focus on an advertising ban is particularly important because a ban is a likely choice of public policy for the control of alcohol advertising. The data set used in this study is a pooled time series of data from 17 countries. The independent

variables include measures which indicate whether alcohol advertising is allowed or banned. An international data set is the only way to measure the effect of a ban on alcohol advertising. Data from one country cannot be used since changes in alcohol advertising bans within countries are rare and the imposition of a ban requires an extended period for consumption to adjust. There is, however, considerable variation in the use of advertising bans across countries.

II. Empirical Framework

Consumer demand theory provides the conceptual framework for the empirical models. To develop the demand for alcohol, assume that an individual's utility depends on the consumption of alcohol, the consumption of other goods, and taste.[1] Maximizing this utility function subject to an income constraint yields a demand for alcohol function. The theory predicts that the price of alcohol will have a negative effect on alcohol consumption and that income will have an uncertain effect on alcohol consumption. Alcohol

---

[1]Consumers actually buy specific brands of beer, wine, and spirits rather than alcohol. This could be modeled as a three stage process with alcohol selected in the first stage, beer, wine, and spirits selected in the second stage, and specific brands selected in the third stage. According to Walsh (1982), in the second stage this process imposes the constraint that the marginal rates of substitution between the three alcoholic beverages are independent of expenditures on non-alcohol goods. In the third stage, this process imposes the constraint that the marginal rates of substitution between specific brands of each type of beverage are independent of expenditures on other types of alcoholic beverages. This model emphasizes the distinction between the consumer's decisions about overall alcohol consumption and decisions about specific brands.

advertising enters the individual's demand curve as a determinant of taste. Aggregation of this demand function over individuals results in an empirically testable demand for alcohol function.

Since the purpose of this paper is to measure the effects on alcohol abuse of a ban on alcohol advertising, empirical measures of abusive consumption of alcohol are necessary. Bruun et al. (1975) conclude that data which measures mean alcohol consumption in a population group is proportional to the level of abusive alcohol consumption in that population. However, Duffy and Cohen (1978) conclude that there is significant variation in the distributions of alcohol consumption across populations. This type of variation would make mean alcohol consumption a biased indicator of abusive alcohol consumption.

Because the validity of mean alcohol consumption as a measure of alcohol abuse is unresolved, the liver cirrhosis mortality rate and the motor vehicle fatality rate are also used as empirical measures of alcohol abuse. In a summary of clinical studies of liver cirrhosis, Cook and Tauchen (1982) conclude that the probability of death from liver cirrhosis is directly related to lifetime alcohol consumption and body weight. Current liver cirrhosis mortality rates reflect both current levels of abusive consumption and the trend in drinking in the past decade or two. In a summary of studies on motor vehicle accidents, Donelson (1988) concludes that approximately 50 percent of all fatal motor vehicle accidents in the United States involved alcohol. Donelson also

concludes that the probability of a fatal motor vehicle accident increases exponentially with alcohol consumption.

Neither mean alcohol consumption, the liver cirrhosis mortality rate nor the motor vehicle fatality rate is a perfect measure of abusive alcohol consumption. However, a consistent statistical relationship between alcohol advertising bans and each outcome measure would be evidence of a behavioral relationship between alcohol advertising and alcohol abuse.

Since three dependent variables are used to measure the effect on alcohol abuse of banning alcohol advertisements, three separate equations must be estimated. To estimate the effects of alcohol advertisements on liver cirrhosis mortality rates and motor vehicle fatality rates, two probability functions are assumed. These equations relate the probability of death to an individual's alcohol consumption and a vector of other variables.[2] Substitution of the alcohol demand equation into each probability equation yields reduced form probability equations. Each reduced form relates the probability of death to the variables that determine alcohol demand.

III. Data

The data set used in this study is a time series of cross sections consisting of 17 countries for the years 1970 through

---

[2]These equations can be called production functions because they define the relationship between inputs of alcohol consumption, and other conditions, and the output of mortality rates.

1983. The 17 countries are members of the Organization for Economic Cooperation and Development (OECD). The OECD countries were chosen because they have attempted to maintain a data base of comparable economic and social data since 1960. The member countries of the OECD are also the most developed free market countries in the world. The data set was limited to 17 countries because of the availability of data. The data set begins with 1970 and ends in 1983.[3] Table 1 contains summary definitions and mean values for all the variables.

The first dependent variable used in the regressions is per capita annual consumption of pure alcohol in liters. These data come from the International Survey of Alcohol Beverage Control Polices published by the Brewers Association of Canada (BAC). The variable is computed by adding together the per capita consumption of pure alcohol in beer, wine and spirits. The data are based on different assumptions, by year and country, about the percent of alcohol in each beverage.

The other dependent variables are the liver cirrhosis mortality rate and motor vehicle fatality rate. The liver cirrhosis mortality rate was computed by dividing the annual number of liver

---

[3]Price and income are reported in units of national currency and must be standardized using purchasing power parities. The OECD reports purchasing power parities for the member countries based on 1980 survey data. Although reliability diminishes with distance from the sample year, purchasing power parities can be estimated for earlier years using inflation rates. The first year of the data set used in this study is 1970 since 1970 is as far back as the OECD estimates purchasing power parities. The last year of the data set is 1983 due to the time lag in reporting data.

cirrhosis deaths by population. Similarly, the motor vehicle fatality rate was computed by dividing the annual number of motor vehicle fatalities by population. Liver cirrhosis deaths and motor vehicle fatalities are reported in the United Nations (UN) Demographic Yearbook. The population data were taken from the OECD National Accounts.[4]

The dependent variables have been transformed into logarithmic specifications. The alcohol consumption variable was transformed into the natural logarithm of consumption. This functional form is often used in demand studies. Because of aggregation, these regressions are weighted by $n^{1/2}$, where n is the population of the country. Since the liver cirrhosis mortality rate and motor vehicle fatality rate have restricted ranges, a logistic specification will conform to the data more closely than a linear specification. The logistic specification is most easily achieved by transforming both rates to ln(M/1-M), where M is the rate and ln is the natural logarithm. Maddala (1983) shows that the appropriate weight for this transformation is: $[nM(1-M)]^{1/2}$.

In defining the empirical measure of advertising bans, two generalities in the laws emerge. First, all advertising restrictions group beer and wine into one category with spirits

---

[4]Cirrhosis deaths of people under thirty are generally not caused by alcohol abuse. However, cirrhosis deaths are not available by age. Since total cirrhosis deaths are used to compute the cirrhosis death rate, total population is used as the divisor. Also, only about 50 percent of highway fatalities involve alcohol. However, total highway fatality data are used since there are no objective estimates of the number of highway fatalities involving alcohol.

treated as a separate category. This restriction applies to all countries included in this study. There is no country in the data set which allows spirits advertising but prohibits beer and wine advertising. This reflects the widely held opinion that spirits consumption is potentially more dangerous than beer or wine consumption. Second, bans on alcohol advertising are the same for both television and radio, with print media treated as a separate category.[5]

Two dichotomous alcohol advertising ban variables have been defined. One variable measures bans on spirits advertising and the other measures bans on beer and wine advertising. The spirits advertising ban variable is equal to one if a country has a ban on broadcast advertising of spirits but allows beer and wine advertising and is otherwise equal to one. The beer and wine advertising ban variable is equal to one if a country has a ban on broadcast advertising of beer and wine and is equal to zero

[5]In the United Kingdom spirits advertisements are not televised but may be broadcast on radio. The Brewers Association of Canada also reports that, in Austria, advertisements for spirits are allowed on the radio but not on television. Since television is the more important advertising media, and since only one spirits ban variable is empirically feasible, the U. K. and Austria have been coded as banning broadcast advertising of spirits. In addition, Portugal and Spain have restrictions limiting the times that alcohol advertising can be broadcast. Spain also has increased costs for alcohol advertising. In Scandinavia, light beer is not included in alcohol advertising restrictions. In Denmark there is no commercial advertising of any kind on radio or television. The beer and wine category includes all alcoholic beverages with 23 percent or less alcohol, and spirits is everything above 23 percent. Advertising bans include both voluntary and mandatory prohibition of all advertisements by alcohol beverage category.

otherwise. Every country that has this ban also bans spirits advertisements. These data come primarily from the International Survey of Alcohol Beverage Control Polices.

The alcohol price was computed by dividing private final alcohol expenditures by pure alcohol consumption in liters. The data were divided by the gross domestic product deflator using 1975 as the base year. The data were converted to United States dollars by dividing by the purchasing power parity. Alcohol expenditures, the deflator and purchasing power parities were take from the OECD National Accounts. Alcohol consumption data comes from the Brewers Association of Canada.[6]

Real income was computed by first dividing gross domestic product by population. This was then divided by the gross domestic product deflator and the purchasing power parity. The data are in thousands of U.S. dollars and come from the OECD National Accounts.

The disadvantage of an international data set is the difficulty in measuring the other determinants of consumption that occur across countries. For example, cultural differences, or sentiment, may effect alcohol consumption across countries even after observable phenomena, such as price and income, are controlled. Unfortunately, quantitative information measuring all the factors influencing alcohol consumption across countries does

---

[6]This price variable has two problems. First, the price variable may be correlated with the equation error term if alcohol consumption is measured with error. Second, changes in the percentages of alcohol consumed in the form of beer, wine and spirits will result in changes in the price variable even when the underlying beverage prices are constant.

not exist. The omission of these variables could result in biased estimates of the effects of advertising bans.

One method of approximating the influence of omitted sentiment is the inclusion of a dichotomous variable for countries were alcoholic beverage production is a major industry. In these countries attitudes towards alcohol beverages are likely to be more favorable and consumption may be higher. The alcohol sentiment variable was defined as equal to one for France and Italy and otherwise equal to zero. France and Italy were chosen because per capita alcohol production is considerably above average in both of these countries.

A fixed effects model is a second method of approximating the influence of omitted alcohol control policies. In a fixed effects model a series of country dummy variables replace the independent variables. According to Johnston (1984), this type of model can account for differences in sentiment across countries.[7]

The total alcohol demand equations also includes a measure of tourism. This variable is included because several studies have shown that tourism has a positive influence on alcohol consumption. Tourism is measured by the number of tourist arrivals divided by population. The tourist data come from the UN Statistical Yearbook.

The liver cirrhosis mortality equations also includes a measure of supply and demand for health services. This variable is the general mortality rate. Higher general mortality rates are

---

[7] See Johnson page 405.

associated with lower equilibrium levels of health services. This variable should have a positive relationship to cirrhosis mortality rates. The variable is measured as total mortality from all causes divided by population in thousands. The data come from the UN Demographic Yearbook.

The motor vehicle fatality equations also includes a variable for kilometers of roads. The road variable is measured in kilometers per thousand people and is included as a measure of distances traveled. Several studies have shown that motor vehicle fatalities are related to distances traveled. The road kilometer data was taken primarily from the OECD Statistical Trends in Transport.

IV. Results

Table 2 presents a set of mean values for alcohol consumption, liver cirrhosis mortality rates, motor vehicle fatality rates for 1970 and 1983. These means have been computed for each category of advertising ban. The data are, respectively, for the first and last years of the data set.

While the data in Table 2 are only descriptive, they suggest that alcohol advertising bans can affect alcohol abuse. In 1970 two countries, and in 1983 four countries, banned all broadcast advertisements of alcohol. This group had the lowest values for all three measures of alcohol abuse in both time periods. In 1970, and in 1983, seven countries banned broadcast advertisements of spirits but allow beer and wine advertisements. For both time

periods this group has lower values for the three measures of alcohol abuse than those countries which have no bans on broadcasting alcohol advertisements.[8]

The data in table 2 also illustrates the time trend of the three measures of alcohol abuse.[9] Per capita alcohol consumption increased in all three advertising categories between 1970 and 1983. However, the countries with the more restrictive advertising policies had the lowest increases in consumption. Liver cirrhosis mortality rates did not change significantly during the sample period. However, motor vehicle fatality rates decreased over the sample period. The countries with the most restrictive alcohol advertising policies had the largest decreases in motor vehicle fatality rates.

Table 3 presents the regression results from a set of fixed effects models. These models include only time dummy variables for the years 1970 through 1982 and 16 country dummies. Sweden is the omitted country. The advertising ban variables cannot be included in these models because they are highly collinear with the country dummies. These models cannot explicitly distinguish between the

---

[8]Between 1970 and 1983 three countries changed their laws on broadcast advertising of alcoholic beverages. Spain changed from having no bans to banning spirits advertisements. Finland changed from having no bans to banning all alcohol advertisements. Norway changed from banning only spirits to banning all broadcast alcohol advertisements.

[9]This table is only illustrative of time trend because there is no control for changes in advertising bans that occurred over the time period. However, a regression model can make this distinction.

effects of alcohol advertising bans, other alcohol policies, and alcohol sentiment.

Although any conclusions drawn from the coefficients in Table 3 must be qualified, the results reveal considerable international variation in per capita alcohol consumption, liver cirrhosis mortality rates and motor vehicle fatality rates. The countries in Table 3 are grouped in accordance with their alcohol advertising policy. Since Sweden is the omitted country, the coefficient of each included country represents that country's level of the dependent variable relative to Sweden. For each of the three dependent variables, the average coefficient for the countries which ban all broadcast advertising of alcoholic beverages is smaller than the average for the countries with a spirits ban. Similarly, the average coefficient for the countries with a spirits ban is smaller than the average coefficient for the countries which have no bans on broadcast advertising of alcohol. The mean values are computed with the insignificant values set equal to zero and are reported in Table 3 in the rows labeled group means. These results again suggest that countries with more restrictive alcohol advertising policy have lower levels of alcohol abuse.

Panel A of Table 4 presents the estimation results from another series of fixed effects models. These fixed effects models use only the advertising ban variables and time dummy variables. The purpose of estimating these fixed effects models is to provide an alternative to the independent variable specifications in Panel B of Table 4. The first three models also include the alcohol

sentiment variable. The coefficients of the advertising ban variables are negative and significant in 10 out 12 cases. These fixed effects models again suggest a negative relationship between alcohol advertising bans and alcohol abuse.

The results from six independent variable regression models are presented in Panel B of Table 4. Each regression model includes the two advertising bans, price, income, equation specific control variables, and time dummies. The first three regressions also include the alcohol sentiment variable. Both the beer and wine advertising ban and the spirits advertising ban have negative and significant coefficients in the alcohol demand and motor vehicle fatality regressions. However, in the cirrhosis mortality regressions only the spirits ban is significant in the specification which excludes alcohol sentiment.

The remaining independent variables in the models in panel B of Table 4 are generally significant and conform to a priori expectations. The real price of alcohol is negative in all models. Price is significant in the alcohol demand and liver cirrhosis regressions but not in the motor vehicle fatality regressions. Real income has no a priori expectation but is positive in the alcohol demand and motor vehicle regressions and negative in the liver cirrhosis regressions. The real income coefficients are, however, only marginally significant. Tourism, general mortality, and road kilometers, with one exception, are all positive and significant as expected.

The first three regressions in both panels of Table 4 include the alcohol sentiment variable. Alcohol sentiment is positive and significant in the alcohol demand and liver cirrhosis equations. In these two equations, the inclusion of alcohol sentiment increases the R^2 and changes the magnitude and significance of all the independent variable coefficients. In panel A, the magnitudes of the advertising ban variables are generally lower when alcohol sentiment is included. In panel B, the price coefficient in the alcohol demand equation and the liver cirrhosis equation decreases when alcohol sentiment is included. These changes are important because they show that when sentiment is omitted the effect of the included policy variables may have an upward bias.

The regression results also can be used to estimate the reduction in alcohol abuse in countries with advertising bans relative to those without bans. Since the dependent variables are in logarithmic form, the coefficient of an advertising ban variable can be interpreted as the percentage change occurring when the advertising ban variable equals one.[10] The coefficients from the independent variable models which include alcohol sentiment were used for these estimates. These regressions were used because they are the most inclusive specifications. The regressions indicate that countries with bans on spirits advertising have about 10 percent lower alcohol consumption and motor vehicle fatality rates than countries with no bans. The results also show that countries

[10]These percentages were computed using the method described by Halvorsen and Palmquist (1980).

with bans on beer and wine advertising have about 23 percent lower alcohol consumption and motor vehicle fatality rates than countries with only bans on spirits advertising.

The results also indicate that the three measures of alcohol abuse have distinctly different relationships to advertising and pricing policies and diverging time patterns. The data show that alcohol consumption is related to advertising bans and alcohol price. Liver cirrhosis mortality rates are less consistently related to alcohol advertising bans, but are clearly related to alcohol price. The data also show that motor vehicle fatality rates are related to advertising bans but less clearly related to price. Over the sample period per capita alcohol consumption increased while liver cirrhosis mortality rates remained steady and motor vehicle fatality rates fell. These results suggest that the relationship between alcohol consumption and alcohol abuse is dependent on other factors such as alcohol control policy.

V. Conclusions

Although there have been a number of econometric studies of alcohol advertising policy, there are few prior studies of the effect of a ban on broadcast advertising of alcoholic beverages. Advertising bans are, however, a likely choice of public policy for the control of alcohol advertising. The adoption of an advertising ban is an infrequent event and many years following the institution of an advertising ban are required to allow for adjustment. This leaves data from any one country without

sufficient empirical variation to measure the effect of a ban. There is, however, considerable variation in the use of advertising bans across countries. The data used in this study is, therefore, a pooled time series for 14 years over 17 countries.

The empirical results presented in this paper indicate that the countries which have adopted advertising bans have lower levels of alcohol abuse. Alcohol abuse is measured by per capita alcohol consumption, liver cirrhosis mortality rates, and motor vehicle fatality rates. The results show advertising bans have a significant effect in reducing all three measures of alcohol abuse.

Table 1
Definitions and Means of Variables*

Variable	Definition and Mean
Beer and Wine Ad Ban	A dichotomous variable which is equal to one if a country has a ban on broadcast advertising of beer and wine and is equal to zero otherwise. (Every country that has this ban also bans spirits advertisements.) μ=0.18.
Spirits Ad Ban	A dichotomous variable which is equal to one if a country has a ban on broadcast advertising of spirits, but allows beer and wine advertisements, and is equal to zero otherwise. μ=0.39.
Per Capita Consumption of Pure Alcohol	Consumption in liters per capita of pure alcohol from beer, wine and spirits. μ=9.65.
Liver Cirrhosis Mortality Rate	Annual fatalities from liver cirrhosis divided by population. μ=0.002.
Motor Vehicle Fatality Rate	Annual fatalities from motor vehicle accidents divided by population. μ=0.002.
Real Price of a Liter of Pure Alcohol	Total expenditure on alcoholic beverages divided by pure alcohol consumption in liters. The variable was adjusted by dividing by the GDP deflator and converted to U.S. dollars by dividing by the Purchasing Power Parity. μ=13.85.
Real Income	National income divided by GDP deflator and converted to thousands of U.S. dollars by dividing by the Purchasing Power Parity. μ=5.33.
Alcohol Sentiment	A dichotomous variable equal to one for France and Italy. μ=.118.
Tourism	Number of tourist arrivals divided by population μ=0.61.
General Mortality Rate	Mortality from all causes, per thousand population. μ=9.92.
Road Kilometers	Kilometers of roads divided by population. μ=16.50.

*All data are for the 17 countries for the years 1970 through 1983. The 17 countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States.

Table 2

Mean Values in 1970 and 1983*

Broadcast Advertising Ban	Number of Countries	Alcohol Demand	Liver Cirrhosis Mortality Rate	Motor Vehicle Fatality Rate
		Means for 1970		
All alcohol advertising banned	2	6.34	9	21
Spirits advertising banned	7	7.98	14	22
No bans on alcohol advertising	8	9.48	16	25
		Means for 1983		
All alcohol advertising banned	4	6.56	8	11
Spirits advertising banned	7	9.79	15	18
No bans on alcohol advertising	6	12.03	18	21

*Alcohol demand is measured in liters of pure alcohol per person per year; liver cirrhosis mortality rates and motor vehicle fatality rates are deaths per hundred thousand people per year.

Table 3
Dummy Variable Models*

	Alcohol Demand	Liver Cirrhosis Mortality Rate	Motor Vehicle Fatality Rate
Countries banning all alcohol advertising in 1983			
Norway	-.365	-.799	-.083
	(6.32)	(6.32)	(.88)
Finland	-.026	-.666	.269
	(.51)	(5.92)	(3.36)
Denmark	.417	-.045	.284
	(8.21)	(.51)	(3.64)
GROUP MEAN	.017	-.488	.184
Countries banning spirits advertising in 1983			
Canada	.322	.004	.572
	(8.84)	(.07)	(9.97)
Ireland	.174	-1.178	.282
	(2.95)	(7.23)	(3.16)
Austria	.633	1.043	.811
	(13.96)	(16.54)	(12.72)
United Kingdom	.140	-.965	-.054
	(4.16)	(15.17)	(.96)
United States	.290	.263	.528
	(9.08)	(4.84)	(9.99)
France	1.03	1.051	.478
	(30.63)	(19.10)	(8.73)
Spain	.789	.730	.163
	(22.73)	(12.94)	(2.85)
GROUP MEAN	.483	.135	.405
Countries with no bans on alcohol advertising in 1983			
Portugal	.782	1.065	.786
	(18.29)	(17.45)	(12.69)
Australia	.455	1.04	.647
	(11.54)	(16.55)	(10.82)
Belgium	.540	.215	.645
	(12.71)	(3.10)	(10.29)
Italy	.793	1.121	.412
	(23.62)	(20.44)	(7.52)
Luxembourg	1.00	.906	.798
	(6.49)	(5.27)	(4.52)
Netherlands	.310	-.813	.275
	(7.83)	(9.91)	(4.35)
GROUP MEAN	.647	.598	.594
R-Squared	.97	.98	.89

* The t-ratios are in parentheses. All equations include dummy variables for the years 1970 through 1982 and an intercept term.

Table 4
Regression Results*

	Alcohol Demand	Liver Cirrhosis Mortality Rate	Motor Vehicle Fatality Rate	Alcohol Demand	Liver Cirrhosis Mortality Rate	Motor Vehicle Fatality Rate
			Panel A			
Beer and Wine Ad Ban	-.388 (5.52)	-.588 (3.45)	-.368 (4.01)	-.605 (5.86)	-1.012 (4.31)	-.360 (3.98)
Spirits Ad Ban	-.146 (5.00)	-.197 (3.96)	.021 (.64)	-.290 (6.93)	-.415 (6.23)	.026 (.83)
Alcohol Sentiment	.521 (16.61)	.711 (14.63)	-.019 (.54)			
R-Squared	.66	.59	.24	.23	.19	.23
			Panel B			
Beer and Wine Ad Ban	-.403 (6.04)	.172 (.98)	-.391 (4.26)	-.344 (3.51)	.207 (.97)	-.382 (4.14)
Spirits Ad Ban	-.112 (4.04)	-.011 (.18)	-.099 (2.67)	-.181 (4.49)	-.144 (2.01)	-.108 (2.94)
Real Price	-.014 (5.92)	-.046 (6.24)	-.003 (.75)	-.029 (8.50)	-.076 (9.30)	-.005 (1.47)
Real Income	.014 (1.77)	-.033 (1.71)	.019 (1.61)	.003 (0.27)	-.006 (.25)	.166 (1.44)
Alcohol Sentiment	.442 (16.00)	.527 (10.18)	.063 (1.78)			
Tourism	.322 (8.86)			.294 (5.49)		
General Mortality Rate		-.023 (1.14)			.055 (2.37)	
Road Kilometers			.008 (4.49)			.008 (4.56)
R-Squared	.79	.70	.40	.54	.56	.39

* The t-ratios are in parentheses. All equations include dummy variables for the years 1970 through 1982, and an intercept.

References

Bruun, K. et al., Alcohol Control Policies in a Public Health Perspective, The Finnish Foundation for Alcohol Studies, vol 25, 1975.

Cavanagh, J. and Clairmonte, F., Alcoholic Beverages, St. Martin's Press: New York, 1985.

Comanor, W., and Wilson, T., Advertising and Market Power, Cambridge: Harvard University Press, 1974.

Cook P. and Tauchen G., "The Effect of Liquor Taxes on Heavy Drinking", The Bell Journal of Economics, vol. 13, no. 2, Autumn 1982.

Donelson, A., "The Alcohol-Crash Problem", in Social Control of the Drinking Driver, eds. M. Laurence, J. Snortum, and F. Zimring, University of Chicago Press:Chicago, 1988.

Duffy, J. and Cohen, G., "Total Alcohol Consumption and Excessive Drinking", British Journal of Addiction, vol. 73, 1978.

Grabowski, H. "The Effects of Advertising on the Intraindustry Shifts in Demand", Explorations in Economic Research, 4, 675-701 winter/spring 1977-1978.

Halvorsen R., and Palmquist R., "The Interpretation of Dummy Variables in Semilogarithmic Equations", American Economic Review, vol. 70, no. 3, 474-475, 1980.

Johnston J., Econometric Methods, third ed., McGraw-Hill Book Company: New York, 1984.

Maddala, G.S. Limited Dependent and Qualitative Variables in Econometrics. Cambridge, England: Cambridge University Press, 1983.

McGuiness, T. "An Econometric Analysis of Total Demand for Alcoholic Beverages in the U.K. 1965-1975", Journal of Industrial Economics, 29, 85-105, 1980.

Ogborne, A., and Smart, R., Will Restrictions on Alcohol Advertising Reduce Alcohol Consumption?", British Journal of Addiction, 75, 293-296 1980.

Ornstein, S. and Hanssens, D., "Alcohol Control Laws and the Consumption of Distilled Spirits and Beer", Journal of Consumer Research, 12, 200-213, 1985.

Simpson, H., Beirness, D., Mayhew, D, and Donelson, A., " Alcohol Specific Controls: Implications for Road Safety", Ottawa: Traffic Injury Research Foundation of Canada, 1985.

Smart, R., "Does Alcohol Advertising Affect Overall Consumption? A Review of Empirical Studies", Journal of Studies on Alcohol, vol. 49, no. 4, 1988.

Smart, R. and Cutler R., "The Alcohol Advertising Ban in British Columbia: Problems and Effects on Beverage Consumption", British Journal of Addiction, 71, 13-21 1976.

Strickland D. "Social Learning and Deviant Behavior: A Specific Test of a General Theory:A Comment and Critique", American Sociological Review, vol. 47, Feb. 1982.

Walsh B., "The Demand for Alcohol in the UK: A Comment", The Journal of Industrial Economics, vol. 30, no. 4, June 1982.

Data Sources

Addiction Research Foundation, Statistics on Alcohol and Drug Use in Canada and other Countries, Volume I and II, Toronto, Canada, 1984.

Brewers Association of Canada, International Survey of Alcoholic Beverage Taxation and Control Policies, Toronto Canada, 6th edition, 1986.

Davies P. and Walsh D., Alcohol Control in Europe, Croom Helm: London, 1983.

Dunn S., International Handbook of Advertising, McGraw Hill, New York, 1964.

Dunn S. and Lorimor E., International Advertising and Marketing, Grid Publishing Inc., Columbus Ohio, 1979.

International Advertising Association, edited by Neelankavil J., Restrictions on Advertising by Media and Selected Products in 16 Countries of Europe, 1985.

Organization for Economic Cooperation and Development, Measuring Health Care 1960-1983, Geneva Switzerland, 1985.

---------, National Accounts Volume I and II, Geneva, Switzerland, 1970 to 1983.

---------, Statistical Trends in Transport 1965-1983, Geneva, Switzerland, 1986.

Standard Directory of Worldwide Marketing, National Register Publishing Co., Wilmette, Il., 1987.

United Nations, Demographic Yearbook, New York, 1971 to 1984.

---------, Statistical Yearbook, New York, 1971 to 1984.

---------, Yearbook of Industrial Statistics, volume II, New York, 1971 to 1984.