

The Economics Of Alcohol Abuse And Alcohol-Control Policies

Price levels, including excise taxes, are effective at controlling alcohol consumption. Raising excise taxes would be in the public interest.

by Philip J. Cook and Michael J. Moore

ABSTRACT: Economic research has contributed to the evaluation of alcohol policy through empirical analysis of the effects of alcohol-control measures on alcohol consumption and its consequences. It has also provided an accounting framework for defining and comparing costs and benefits of alcohol consumption and related policy interventions, including excise taxes. The most important finding from the economics literature is that consumers tend to drink less ethanol, and have fewer alcohol-related problems, when alcoholic beverage prices are increased or alcohol availability is restricted. That set of findings is relevant for policy purposes because alcohol abuse imposes large “external” costs on others. Important challenges remain, including developing a better understanding of the effects of drinking on labor-market productivity.

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**ECONOMICS
OF ALCOHOL**

THE PRODUCTION AND SALE OF ALCOHOLIC BEVERAGES account for a small share of national product in the United States and in other advanced economies. However, the deleterious effects of alcohol consumption on health and safety constitute a substantial economic burden, reducing our overall standard of living. Chronic heavy drinking causes organ damage that results in disability and early death. Other possible consequences include cognitive impairment, addiction, reduced productivity, neglect of family responsibilities, and birth defects. The acute effects of alcohol abuse are still more costly: traumatic injury and property damage from accidents, criminal victimization, domestic violence, unwanted sexual encounters and venereal diseases, and hangover. In sum, alcohol is not just another commodity. Around the world, historically and currently, public concern about the consequences of excess alcohol consumption for individual health and community

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well-being has been incorporated in cultural norms, which are often reinforced by private rules and government regulation.

The nature and extent of government involvement in the alcohol market has varied widely over time and place, reaching a logical extreme in the United States with Prohibition in the 1920s. Every state now has a wide array of alcohol-control measures in place, including a minimum age of purchase (twenty-one), excise taxes, a licensing system for retail outlets, and penalties for driving under alcohol's influence. While alcohol control is not so contentious as when the temperance movement was in full flower, the relevant policies continue to be debated and are subject to change.

To some extent, the debate over appropriate policy is concerned with factual issues. That is the arena in which economists have made their primary contribution. Economic research on the effects of alcohol-control measures on consumption and its consequences has helped to establish that such measures can be effective in reducing alcohol abuse and improving public health. But the debate is also concerned with values—of how best to balance the conflicts between individual liberty and community well-being. Economists have contributed to this discussion through application of cost-benefit analysis to the evaluation of alcohol-control measures and treatment. Economists' normative framework is distinguished in part by its incorporation of the consumer-sovereignty principle, acknowledging the pleasures of drinking as well as the pains.

This paper provides a brief summary of the economics literature on drinking and its consequences, with a focus on the effects of alcohol-control measures. We conclude by suggesting that higher tax rates on alcoholic beverages would be in the public interest and noting the importance of further research on drinking and productivity.

Consumption Patterns

Beer, wine, and spirits all contain ethyl alcohol (ethanol) in differing concentrations. A standard drink consists of 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of spirits, each of which has about the same amount of ethanol (approximately 0.6 ounces).

Apparent consumption of ethanol per capita (age fourteen and over) peaked in 1980 and 1981, after two decades of steady growth, at 2.76 gallons per year—almost two drinks per day. Average consumption has declined since then by more than 20 percent. In 1997 the ethanol consumption of 2.18 gallons per capita was 57 percent from beer, 14 percent from wine, and 29 percent from spirits.¹

Such statistics are computed from state excise-tax records and industry reports and are subject to certain errors. (Excise taxes are imposed by the federal and state governments on wholesalers and

are typically quoted on the basis of a fixed charge per gallon rather than as a percentage of value.) The records omit home production and take no account of wastage; also, the conversion from beverage volume to ethanol volume (based on estimates of industry averages) may be somewhat imprecise. But under the current regulatory regime, in which the excise tax, adjusted for inflation, is far less than in the 1950s and the incentive for illicit production correspondingly slight, the official statistics are probably quite accurate.

In any event, statistics on average consumption conceal the wide variation among individuals. The National Household Survey on Drug Abuse for 1996 estimated that 65 percent of adults had at least one drink during the previous twelve months, while 50 percent drank during the previous month. The prevalence of self-reported drinking decreases in middle age and is much lower for women than for men. For both men and women the self-reported prevalence of drinking increases with education and family income and is lower for blacks than for whites.

Among those who drink, there are wide differences in quantity consumed. As a result, the purchase and consumption of alcohol are highly concentrated. In particular, those in the top decile (ten percentage points) of the drinking distribution consume more than half of all ethanol. Since alcohol problems are also highly concentrated among this group, it seems reasonable to target alcohol-control measures at them. But according to one school of thought (sometimes known as the “Single Distribution Theory”), informed by a good deal of evidence from different times and places, drinking practices are closely linked within a population.² Hence, reducing the amount that the heaviest drinkers consume may require a shift downward of the entire distribution of drinking, and the aim of alcohol-control policies must ultimately be to reduce average consumption.³ This belief strengthens the rationale for including general restrictions on alcohol availability, such as excise taxes, in the portfolio of policies directed at reducing the costs of alcohol abuse. But the Single Distribution Theory is not necessary for establishing the importance of taxes and other alcohol-control measures as public health measures; the direct evidence on this matter is extensive and persuasive.

Demand For Alcoholic Beverages

One thing that economists agree on is that if the price of a commodity is increased, the quantity purchased and consumed will decrease, other things being equal. But it is tempting to believe that alcoholic beverages—and especially the “active ingredient,” ethanol—may be an exception to this rule. For one thing, consumption of alcohol is

limited in a variety of ways, not just price. Legal restrictions, cultural norms, and rules imposed by employers and other private organizations on where and when alcohol can be consumed are all relevant. Another limiting factor is widespread distaste for alcohol and the consequences of consumption. Price may be a secondary concern in this mix. Furthermore, alcohol represents a rather small part of the typical household budget, amounting to 2 percent of personal consumption expenditures, and employers pick up the tab for about 20 percent of alcohol sales.⁴

The most compelling argument that “alcohol is different” when it comes to the price effect may be that drinking is habit forming. Conventional wisdom (but not, it should be noted, economic theory) suggests that price will not matter much to those who have become addicted.⁵ In response to a general price increase for alcoholic beverages, alcoholics without much income could preserve their habit by seeking cheaper sources of ethanol: drinking off-premises rather than in bars, or buying fortified wine instead of table wine. However, and despite these plausible speculations, the evidence is clear that alcoholic beverages do obey the economists’ dictum after all: An increase in price results in reduced consumption, not only of the volume of beverage but also of ethanol.

Econometric studies of the aggregate demand for alcoholic beverages have been conducted with a wide variety of data sets. The consistent result, for both the United States and other countries, is that sales of beer, wine, and spirits are responsive to price, after accounting for other factors. Economists often report the degree of responsiveness in terms of the price elasticity of demand, defined as the percentage change in quantity associated with a 1 percent increase in price. By that measure, beer tends to be the least responsive and spirits the most responsive, for reasons that are not well understood.⁶ But price matters for each type of beverage.

More interesting than the effect of price changes on aggregate demand is the effect on drinking patterns that may impinge on health and safety. We would like to know how economic factors affect the prevalence of abstention, bingeing, and chronic heavy drinking. Drinking by particular population groups, such as women during their child-bearing years and youths, are also of special interest. This sort of detailed empirical analysis cannot be performed with the aggregate data generated by the excise-tax system; rather, it requires data on individuals. In most cases, such microdata are taken from surveys in which respondents are asked to report how much they drink. Needless to say, many people are not entirely truthful about this matter, or they may be fooling themselves; whatever the reason, surveys tend to underestimate total consumption by

40–60 percent.⁷ Thus, analysis of self-reported data must always proceed with caution, given that observed patterns may reflect systematic reporting errors as well as the reality of alcohol consumption.

■ **Drinking by youths.** Much of the econometric research of survey data has focused on drinking by youths. Teenagers and young adults are of special concern for several reasons. First, youths exhibit relatively high rates (compared with their elders) of binge drinking and involvement in motor vehicle accidents and violent crime.⁸ Second, to the extent that drinking is habit forming, youthful drinking sets the pattern for later consumption. Third, drinking behavior during the transition from adolescence to adulthood may have consequences for human capital and family formation.⁹

A series of studies have documented the sensitivity of youthful drinking to both minimum-purchase-age (MPA) laws and to beer prices.¹⁰ (The focus on beer is dictated by the fact that most ethanol consumed by U.S. youths is in the form of beer.) Some of our recent research, using the extensive data from the National Longitudinal Survey of Youth (NLSY), illustrates this type of analysis.¹¹

The NLSY surveyed more than 12,000 youths ages fourteen to twenty-one in 1979 and has reinterviewed them a number of times since then. The questionnaires included items on alcohol consumption in the annual surveys of 1982–1985, and again in 1988 and 1989. Over the years a wealth of other information has been collected on parents and siblings, schooling, work, earnings, health status, and other matters. Alcoholic beverage price information was not obtained from respondents but can be imputed by knowing the respondents' state of residence and the survey year.

In our study we used the state beer excise tax as an indicator of average price, since these taxes are typically passed on to consumers in the form of retail prices that are higher by at least the amount of the tax. The other policy variable of interest is the MPA, which we coded as to whether the youth was of an age to be bound by the MPA in his or her state. (During the 1980s, unlike in recent years, states had different MPAs and changed them from time to time.) We used multivariate regression methods to assess the effects of excise taxes and MPA on drinking patterns, controlling for a number of other characteristics that may affect youths' drinking decisions: race, ethnicity, age, aptitude, schooling, socioeconomic status of parents, family structure, religion during childhood, and so forth. Our results indicate that both the price of beer (as indicated by the tax rate) and the MPA affect youths' drinking decisions. In particular, we looked at two measures of drinking: whether the youth had consumed at least one drink in the previous thirty days, and whether the youth had been "bingeing" (consuming six or more

drinks on a single occasion) each week. Both the tax and MPA had some effect on the drinking decision, and the MPA had a considerable effect on the likelihood of bingeing.

We also found that growing up in a state with lax alcohol-control measures may increase the chance of later bingeing. Respondents who at age fourteen were in a state with a low MPA (eighteen) were more likely to report bingeing later, other things being equal. A natural interpretation of this result is that a low MPA provides a “wetter” environment for a fourteen-year-old adolescent, which translates into more drinking at the time and, because of the habit-forming quality of alcohol, later.

It should be noted that economists who have studied the effect of alcohol-control measures on youth drinking patterns, using diverse data sources and statistical methods, have not all reached the same conclusion. But with only a few exceptions, published studies find that even small variations in prices matter somewhat.¹² Also, there is consensus that the MPA is effective in controlling alcohol consumption and abuse by those young enough to be affected. Of course, such alcohol-control measures are not all that matters in youthful decisions, but the tax and MPA are of special interest because they, unlike, for example, gender, age, and genetic predisposition, are under legislative control.

A more general finding concerning youthful drinking is also salient.¹³ The prevalence of drinking and bingeing among high school students has declined considerably since the high levels circa 1980. This decline cannot be explained by changes in alcohol-control measures and is actually something of a mystery. But whatever its cause, the trend among teenagers is closely linked to the trend in adult drinking—just as predicted by the Single Distribution Theory.

■ **Heavy drinking.** Some people acquire such a strong appetite for alcohol that they are willing to sacrifice their health and much else for the sake of continued heavy drinking. Symptoms of strong commitment to alcohol are the basis for a diagnosis of alcohol dependence, a form of mental illness more commonly known as alcoholism. Often, alcoholics are described as suffering a “loss of control” over their drinking. Yet the evidence suggests that this description is not entirely accurate and that chronic heavy drinkers do respond to economic incentives.¹⁴

An early experiment compared drinking patterns of fourteen male alcoholics as a function of the cost of a drink.¹⁵ Subjects who were required to work twice as hard for their alcohol drank half as much as comparable subjects in a similar situation. Other experiments with inpatient alcoholics found that their drinking could be reduced by contingent loss of privileges and increased financial in-

centives for abstinence.¹⁶ Similar results emerged from an experiment with noninstitutionalized heavy drinkers.¹⁷

Economists have contributed to this discussion by analyzing nonexperimental data on populations. A traditional indicator of the prevalence of chronic heavy drinking in a population is the mortality rate from liver cirrhosis.¹⁸ Although cirrhosis has a variety of causes, drinking accounts for a majority of cirrhosis deaths in population groups where drinking is common. There is considerable evidence that cirrhosis death rates are sensitive to alcohol availability, which suggests that the group at risk for alcohol-related cirrhosis, long-term heavy drinkers, is at least somewhat sensitive to price. Notable examples have been associated with alcohol prohibition and with the economic disruptions during the First and Second World Wars.¹⁹ (For example, the cirrhosis mortality rate dropped to half of its 1914 level by 1920 because of state and wartime prohibition and remained at the new low level throughout the Prohibition period.)²⁰

Several studies have documented that increases in state liquor taxes also have reduced the cirrhosis mortality rate.²¹ Part of the effect is immediate, as those with cirrhotic livers reduce their consumption and hence postpone death. The full effect is only realized over many years, as higher alcohol prices reduce recruitment of new heavy drinkers.

Controlling Intoxication And Its Consequences

The U.S. Centers for Disease Control and Prevention (CDC) estimated “alcohol-related mortality” as 105,000 in 1987, 4.9 percent of all deaths in that year.²² Nearly half (46 percent) of the deaths were related to intoxication, including accidents and intentional violence. By another conventional public health measure, “years of life lost before age sixty-five,” such violent deaths constitute fully 80 percent of the alcohol problem in the United States.²³ Organ damage from chronic excess drinking has a relatively small effect on life expectancy.

■ **Highway safety.** Highway safety has been the greatest public concern in connection with alcohol abuse. Economists have analyzed the effects of alcohol-control measures on the incidence of drunk driving (measured by use of survey data) and highway fatality rates (from official statistics).²⁴ As in the case of the demand studies, there is near consensus that the MPA matters, reducing the highway fatality rate for the affected age groups by about 7 percent.²⁵ The evidence is more mixed on the effects of price, although most studies offer support for the view that even small price increases (associated with state excise-tax increases) cause some reduction in alcohol-related fatal accidents.²⁶

■ **Alcohol advertising.** Advertising also may play some role in promoting alcohol abuse and highway fatalities. Henry Saffer analyzed the relationship between fatality rates and alcohol advertising in the top seventy-five media markets.²⁷ After accounting for regional price differences and population variables such as income and religion, he found that alcohol advertising was significantly related to total and nighttime vehicle fatalities, to the extent that a total ban on alcohol advertising might be expected to save several thousand lives per year.

■ **Impact of fines and liability laws.** Much of the drinking that leads to drunk driving occurs on-premises, at bars, clubs, and restaurants. States have acted in various ways to reduce this deadly linkage, for instance by using the threat of fines or even license revocation to discourage service to minors and intoxicated persons. A number of states have “dram shop” liability for commercial servers, holding them potentially liable for the damage done by patrons after drinking too much at these establishments. There is some evidence that the imposition of liability is effective at reducing highway fatalities.²⁸ A recent study found that the behavior of servers in monitoring the drinking of adult patrons is influenced by the management’s perception of the likelihood of being sued.²⁹

■ **Linkage with violence and risky sex.** Alcohol abuse is also linked to violence. Under the influence of alcohol, a parent may be provoked to strike an irritating child; a college student may forcefully insist on having sex with his date; friends may escalate an argument into a bloody fight; a robbery victim may foolishly attempt resistance in the face of a loaded gun; soccer fans may riot in response to an unsatisfactory outcome. Some people are more prone to violence, or to provoking violence, when drinking than when sober.³⁰ Only a few studies have attempted to link violence to alcohol-control measures, and these offer evidence that raising excise taxes on alcoholic beverages would reduce criminal and family violence.³¹

Risky and unwanted sex is yet another consequence associated with alcohol abuse, and the epidemiological evidence suggests that as a result alcohol abuse promotes the spread of venereal disease. A recent econometric analysis of gonorrhea rates among youths demonstrated that this is yet another outcome that can be curtailed through more stringent alcohol-control measures.³²

Drinking And Productivity

The belief that drinking impairs productivity has helped to motivate a wide range of both private and public responses, from workplace rules banning drinking on the job to alcohol regulations governing the armed forces. Historically, this concern with the quality and

quantity of work was a major factor in nineteenth-century temperance movements in the United States and Europe.³³ In recent times the belief that alcohol abuse reduces the productivity of some employees has persuaded the majority of large U.S. corporations to establish occupational alcoholism programs or employee assistance programs.³⁴ And several government-commissioned estimates of the economic costs of alcohol abuse have asserted that these costs are predominantly the result of reduced productivity.³⁵ Curiously, however, the belief that drinking impairs productivity does not receive unambiguous support from the econometric work on the subject.

Based on fairly extensive research by a number of economists, it appears that the estimated relationship between self-reported drinking and measures of the quality and quantity of labor supply (hours worked, earnings, absenteeism) is not what we might expect. In fact, self-reported abstainers earn less on average than drinkers, even when a wide range of other productivity-related characteristics are taken into account by use of multivariate statistical methods. This finding is reminiscent of the well-established finding in the medical literature that drinking reduces the likelihood of coronary heart disease, and moderate drinking in middle age extends life expectancy overall.³⁶ The difference between the “abstention penalty” in heart disease and productivity is that the medical effect appears much more plausible, as there exist physiological mechanisms by which regular drinking could improve cardiovascular health. But no economist has documented a plausible mechanism that could account for how drinking could improve productivity, especially among youths (for whom the effect on heart disease is irrelevant). This puzzle has not yet been resolved.

The evidence on whether heavy drinkers tend to fare more poorly in the labor market than light drinkers do is mixed, with some studies reporting the existence of a penalty for heavy drinking and others finding no such penalty. And while men of prime working age who exhibit symptoms of alcohol dependence or abuse earn less than those who do not exhibit such symptoms, their female counterparts appear to earn more.³⁷

In any event, it seems safe to say that the direct effect of drinking on productivity in the U.S. context is small.³⁸ There is persuasive evidence, however, that heavy drinking has an indirect effect on productivity by interfering with schooling and family formation, both of which affect subsequent productivity and earnings.³⁹

Evaluation Of Alcohol-Control Measures

Alcohol-control measures are effective only to the extent that they affect consumers’ decisions about drinking. By restricting alcohol

availability, they impinge on the enjoyment consumers derive from alcohol. In judging how high to set excise taxes or the MPA law, or how much to restrict on-premises service or alcohol advertising, it is necessary to weigh the loss of enjoyment against the possible gains in health, safety, public order, and so forth. A direct comparison of these apparently incommensurable consequences is not easy, but economics provides a well-developed framework for doing just that.

■ **Excise taxes.** Much of the research in this area has focused on the question of alcohol excise taxation. How high should these taxes be set? One standard is that the tax revenues should be adequate to pay the “external” costs of alcohol consumption, that is, the costs that are not borne by the drinker.⁴⁰ By that standard, it is not appropriate for the tax rate to take into account that drinkers are at heightened risk of injury, since they already “pay” that cost and presumably take it into account in making their consumption decisions. On the other hand, to the extent that drinkers place others at greater risk of injury (an “external” cost), that should be reflected in the tax rate, for at least two reasons. First, it is only fair that drinkers should compensate the public for the external costs of their choices. Second, if alcohol prices do not reflect the full social costs of consumption (including the external costs), then consumers will drink too much, in the technical sense that at the margin their drinks will be worth less to them than they cost.

A much-cited study of the costs of heavy drinking followed the economists’ normative framework, distinguishing between “internal” costs (those that are borne by the drinker and presumably taken into account in the drinking decision) and “external” costs (inflicted by drinkers on bystanders).⁴¹ If we accept the principle of consumer sovereignty, then it is the external costs that are relevant for policy purposes. On the basis of data from the mid-1980s, Willard Manning and his colleagues found that the “external” cost per ounce of ethanol consumed was about forty-eight cents, double the average state and federal tax per ounce that was then in place.⁴² Much of the external costs of alcohol consumption are borne by victims of intoxicated drivers. (By way of contrast, most smoking-related costs, including morbidity and early death, are borne by the smokers themselves and hence do not support higher excise taxes.) The obvious conclusion is that alcohol taxes are too low. A subsequent study amplified this conclusion by noting that Manning and colleagues had failed to account for nonfatal highway injuries.⁴³ Including injuries increased the estimate of external costs to sixty-three cents per ounce. A still higher estimate would follow from changing the original assumption that intrafamily effects of alcohol abuse should be ignored in setting the tax rate. These effects are “internal” to the

extent that family members are tied together by sentiment and shared responsibilities. Nonetheless, family members have individual interests that are sometimes in conflict; in particular, there is a clear public stake in preventing alcohol-induced child abuse and neglect and fetal damage. Some economists have gone further and argued that for a variety of reasons, individuals may tend to take inadequate account of their future interests when making decisions about the consumption of habit-forming commodities, which provides yet another rationale for government intervention.⁴⁴

Concluding Thoughts

Arguably, the most important contribution of economists has been the repeated demonstration that alcohol is no exception to the economic law of downward-sloping demand. The price level of alcoholic beverages influences per capita consumption levels of ethanol, as well as the incidence of alcohol abuse and its health-related consequences. Hence, excise taxes on alcoholic beverages are effective alcohol-control measures that can be used to promote public health. The minimum purchase age is also effective at reducing abuse. Other measures, including restrictions on alcohol advertising and dram-shop liability, appear promising.

Just because an alcohol-control measure is effective at reducing abuse does not by itself justify its implementation. The costs as well as the benefits of government interventions deserve attention. Economics offers a normative framework for evaluating the trade-offs involved, one that honors consumers' preferences and acknowledges that alcohol is a source of legitimate enjoyment but that people will tend to drink too much unless they are forced to take account of the full costs associated with consumption.

Based on that perspective and the empirical work cited above, a clear conclusion emerges: Current excise-tax rates are too low, both nationally and in every state. The rates are far less than the average social cost of each drink consumed. Raising the excise tax would be in the public interest, despite the fact that it lacks precision. One could envision a more nuanced policy that adjusted tax rates to risk levels based on beverage type and location of sale; for example, on-premises sales could be subject to higher tax rates because they are more closely linked to traffic injuries than package sales are. Furthermore, successful policies to separate drinking from driving and to reduce abusive drinking directly would correspondingly reduce the ideal tax rate.

In our view, a reasonable agenda for economics research on drinking, abuse, and its consequences would continue to focus on the evaluation of alcohol-control measures, in the hope of establishing a

stronger consensus on the effects of excise taxes, liability rules, and advertising restrictions. Also important is further economic research evaluating treatment for dependence and abuse (a topic not discussed here). Perhaps the most compelling agenda item, however, is settling the mystery of how drinking affects earnings and productivity.

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NOTES

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