The Effects of Price on the 
Consequences of Alcohol Use 
and Abuse

Frank J. Chaloupka, Michael Grossman, 
and Henry Saffer

Abstract. Economists have examined the impact of alcohol prices on various outcomes related to alcohol consumption, including nonfatal and fatal motor vehicle accidents, other accidents, liver cirrhosis, and other alcohol-related mortality, crime, and education attainment. Price, in the context of this research, includes not only the monetary price of alcoholic beverages, but also a wide variety of other "costs" of drinking and heavy drinking, including the time spent obtaining alcoholic beverages and the legal costs associated with drinking and related behavior. This research clearly demonstrates that increases in the monetary prices of alcoholic beverages, which could be achieved by increasing taxes on alcohol, can significantly reduce many of the problems associated with alcohol use and abuse. In addition, control policies that raise other "costs" of drinking, including reduced availability of alcoholic beverages, higher legal drinking ages, and others, are also effective in reducing the consequences of alcohol use and abuse.

1. Introduction

In this chapter, we summarize the research by economists that examines the impact of the price of alcoholic beverages on a variety of outcomes related to
alcohol consumption, including nonfatal motor vehicle accidents, other potentially alcohol-related accidents, liver cirrhosis mortality, crime, and educational attainment. Since the early 1980s, a growing number of economists have been researching the impact of price on alcohol consumption and its consequences. This research uses a wide variety of aggregate and individual data and generally concludes that increases in the price of alcoholic beverages, by reducing drinking, heavy drinking, and related behavior, are effective in reducing the consequences of alcohol use and abuse. These findings are clearly relevant for policymakers, given that there are a number of aspects of price that are policy manipulable.

Price, in the context of economic research on problems related to alcohol use and misuse, includes not only the monetary price of alcoholic beverages, but also a wide variety of other "costs" of drinking and heavy drinking. The other costs of drinking and related behavior that are commonly included in this research are the time costs of obtaining alcoholic beverages as well as the expected legal costs associated with drinking and related behavior.

Federal, state, and local government policies have raised many aspects of the "full price" of alcoholic beverages in the antidrinking campaign of the past 20 years. Until recently, higher monetary prices for alcoholic beverages, which could be achieved by increased taxation, have generally been ignored in the antidrinking campaign. In January 1991, federal excise taxes on beer and wine were raised for the first time since November 1951, while the tax on distilled spirits was raised for only the second time during that period. As a result of Title XI of the Omnibus Budget Reconciliation Act of 1990, the federal beer excise tax was doubled from 16 cents per six-pack to 32 cents, while the tax on wine was raised nearly sevenfold, from just over 3 cents per 750-ml bottle to about 21 cents. This act also increased the distilled spirits tax by $1.00 per gallon, raising the tax from $2.00 per fifth of 80-proof alcohol to $2.16. While there is some evidence that Congress may have been persuaded by the health promotion aspects of higher alcoholic beverage taxes, these increases were well below those recommended by numerous public health organizations. They also fell far short of the 25-cent tax per ounce of pure alcohol in any beverage that was initially proposed by the Bush Administration (the rates resulting from the 1991 tax increase are approximately 10 cents, 7 cents, and 21 cents for beer, wine, and distilled spirits, respectively).

Like the federal government, state and local governments have raised taxes on alcohol modestly and infrequently, almost always with the intent of increasing revenues rather than discouraging alcohol use and abuse. Due in part to the stability of these taxes, the real prices for alcoholic beverages (i.e., their prices after accounting for the effects of inflation) have declined significantly over time. For example, between 1975 and 1990, the real price of distilled spirits fell by 32%, the real price of wine fell by 28%, and the real price of beer fell by 20%.

The 1991 increases in the federal alcoholic beverage excise taxes fell far short of those needed to offset the effects of inflation since 1951. For example,
the distilled spirits tax would have needed to have been more than four times larger than what was enacted ($8,80 per fifth of 80 proof liquor) to have the same real value as it had in 1951. Similarly, more than a fivefold increase in the beer tax, to 84 cents per six-pack, would have been needed. The increase in the wine tax, however, was large enough to offset the effects of inflation since 1951. If alcohol abuse is affected by price, as economists have argued, then allowing the real value of alcoholic beverage taxes and consequently prices to decline will exacerbate the problems associated with alcohol use and abuse.

In contrast to their relative inactivity with respect to raising alcoholic beverage taxes, the federal, state, and local governments have engaged in an active campaign over the past two decades to reduce heavy drinking and its consequences. Much of this campaign has focused on youths and young adults, given the disproportionate incidence of alcohol-related problems in this population. The most important element of the antidrinking campaign with respect to adolescent alcohol abuse has been the upward trend in state minimum legal ages for the purchase and consumption of alcoholic beverages. The Twenty-sixth Amendment, which lowered the voting age from 21 to 18 years in 1972, led 29 states to reduce their legal drinking ages in the period from 1970 to 1975. This downward trend was reversed, however, when Minnesota raised its drinking age from 18 to 19 years in 1976. This was followed by increases in 27 other states prior to the passage of the Federal Uniform Drinking Age Act of 1984 (Public Law 98-363). This act accelerated the upward trend by withholding federal highway funds from states that failed to raise drinking ages on all alcoholic beverages to 21 years by October 1, 1986. By 1987, all states had complied, although grandfather clauses in some states kept the effective age below 21 years until 1990. Increases in the legal drinking age are expected to significantly raise the full price of alcoholic beverages to youth by reducing availability and increasing the expected legal costs of drinking.

Other policies in the antidrinking campaign have targeted all segments of the population and focus on problems related to alcohol use and abuse. For example, the Federal Alcohol Traffic Safety Act of 1983 (Public Law 97-364), provided financial incentives for states to adopt and enforce more stringent policies related to drinking and driving. These measures include easing the standards required for arresting and convicting drunk drivers, more severe and certain penalties for conviction of drunk driving, and the increased allocation of resources for apprehending drunk drivers. In the several years after this Act, hundreds of new state and local laws related to drinking and driving were adopted. Moreover, this trend shows no signs of abating, with numerous new and stronger laws being enacted throughout the 1990s. In addition to the laws targeting all drinking drivers, several states have recently adopted laws targeting underage drinking drivers by making it per se illegal to drive with either blood alcohol concentrations well below those used for adults or, in some states, any measurable amount of alcohol (the so-called "zero tolerance" laws).
These new laws were designed to both punish drunk drivers and to deter others from drinking and driving. The assumption of rational behavior provides a foundation for the deterrence effect. While driving when drunk may not be a rational decision, the joint decision to drink and then drive can be thought of as a rational process. In his economic theory of crime, recent Nobel laureate Gary S. Becker\textsuperscript{e} shows that the number of offenses committed by an individual is inversely related to the cost of each offense. In the context of drunk driving, the laws increasing the probabilities of arrest and conviction for drunken driving, as well as those raising the penalties upon conviction, raise the cost of drinking and driving.

Another key element in the antidrinking campaign is Public Law 100-690, which, since November 1989, has required that all alcoholic beverages sold in the United States must carry a warning label informing drinkers of such dangers as drunk driving, drinking during pregnancy, and other (unspecified) health problems. The warning label can raise the full price of alcoholic beverages by raising the perceived health costs of drinking.

In addition to reducing the availability of alcohol to youth, many states and localities have adopted other policies that limit availability for all drinkers. These include regulations that limit the places and/or times where alcoholic beverages can be sold, as well as dram shop laws (either statutes or case laws), which hold servers liable for the harmful actions of their patrons who drink to excess. In many states, there are special provisions in the dram shop laws that relate to serving underage drinkers. By raising the full price of drinking and excessive drinking, these limits on availability can reduce the consequences of alcohol use and abuse. Other policies that are becoming increasingly prevalent, including restricting or banning “happy hours,” training and/or licensing servers, penalizing parents who allow underage drinking parties in their homes, can also raise various components of the full price of drinking and consequently reduce the consequences of alcohol use and abuse.

2. Theoretical and Analytical Framework

Perhaps the most fundamental principle of economics is that of the downward sloping demand curve that states that as the price of any good rises, the consumption of that good falls. Noneconomists, as well as some economists, have argued that the consumption of a potentially addictive good, such as alcohol, might be an exception to this rule. However, numerous econometric studies\textsuperscript{2} including those that explicitly model the addictive aspects of consumption\textsuperscript{3,7,8} confirm that this principle does apply to the demand for alcoholic beverages.

However, the impact of price on outcomes related to alcohol use and abuse in part depends on the effect of price on different patterns of drinking,
which may differ with respect to the frequency and/or quantity of alcohol consumption. For example, it may be that the heaviest drinkers and/or binge drinkers are relatively insensitive to price,\textsuperscript{9,10} implying that while price increases may reduce overall alcohol consumption, they would have little impact on outcomes related to excessive or abusive consumption. Alternatively, recent theoretical economic models of addictive behavior\textsuperscript{3,11,12} predict that addicted consumers will be more price responsive in the long run than their nonaddicted counterparts.

The empirical model used in many of the economic analyses of the effects of price on outcomes related to alcohol use and abuse can be derived from a theoretical model consisting of two equations. The first is termed a "production function," which describes how alcohol consumption \((A)\) and various other inputs \((X)\) are related to a particular output \((y)\):

\[
y = f(A, X)
\]  \hspace{1cm} (1)

In the context of this chapter, the outputs include motor vehicle or other accidents, deaths from liver cirrhosis, crime related to alcohol use and abuse, and educational attainment. The vector \(X\) contains other factors related to the outcome; for example, when modeling motor vehicle accidents, this vector includes variables that measure traffic density, roadway conditions, vehicle quality, and other motor vehicle safety measures.

The second equation is the demand for alcohol:

\[
A = g(p, Z)
\]  \hspace{1cm} (2)

where \(p\) reflects the full price of drinking and the vector \(Z\) captures other determinants of demand, including income, the prices of complements to or substitutes for alcohol, and other determinants of tastes. Again, the full price includes not only the monetary price of alcoholic beverages, but also other costs associated with drinking in the context being examined. For example, when examining drinking and driving, \(A\) reflects the demand for alcohol shortly before or while driving, while the full price of alcohol in this context includes the monetary price, measures of alcohol availability, the probabilities of apprehension and conviction for drunken driving, and the penalties associated with apprehension and conviction.

Substituting the alcohol demand equation (2) into the production function (1) produces a reduced form equation in which the effects of price and other factors on outcomes related to alcohol consumption can be estimated:

\[
y = f(p, X, Z)
\]  \hspace{1cm} (3)

This equation can either be estimated using data on individuals or it can be aggregated across individuals.
3. Review of Empirical Studies

3.1. Drinking, Driving, and Motor Vehicle Accidents

There have been a large number of econometric studies estimating the effects of the full price of alcohol on drinking and driving in the United States. Nearly all of these studies use alternative measures of aggregate motor vehicle accident fatality rates as the measure of drinking and driving, given the evidence that alcohol plays a significant role in many of these fatal accidents. Most of these studies employ state level data, although some employ county level data and still others use other aggregate measures. A relatively small number of studies use self-reported, individual level data on drinking and driving and/or involvement in nonfatal traffic accidents.

The motor vehicle accident fatality measures used in these studies are generally constructed from the National Highway Traffic Safety Administration's (NHTSA) Fatal Accident Reporting System (FARS) and are expressed as rates (i.e., deaths per person in the relevant population). Some, however, use alternative measures such as deaths per mile of roadway or deaths per mile traveled. Many of these studies include measures of fatality rates defined for all age groups, while a large number also include a variety of age-specific fatality rates, including several focused on teenagers and young adults (generally ages 15 through 17 years, 18 through 20 years, and 21 through 25 years). Similarly, a wide variety of motor vehicle accident fatality rates are defined based on anticipated alcohol involvement. For example, in addition to total motor vehicle accident fatality rates, several researchers use measures based on the time of day, given that alcohol is much more likely to be involved in nighttime fatal accidents than in daytime accidents. Similarly, several measures are based on the role of the individual killed in the accident (driver, passenger, pedestrian/other) as well as the number of vehicles involved in the accident. Finally, Chaloupka et al. use the information on blood alcohol concentration (BAC) of dead drivers to construct measures of alcohol-involved driver fatality rates based on a BAC of 0.05%, the level used by most states to define alcohol involvement.

3.1.1. Alcoholic Beverage Taxes and Prices. The most commonly used measure for the monetary price of alcoholic beverages in these studies is the excise tax on beer. This choice is made for a variety of reasons, most notably because beer is the most popular alcoholic beverage in the United States and because meaningful data on wine and distilled spirits taxes are only available for states that license the sale of all alcoholic beverages. In addition, some have argued (Ruhm, for example) that the tax is a more relevant measure for policymakers as well as that the tax can be considered exogenous, while the price may depend on the interaction of the supply and demand for alcoholic beverages.
Finally, a few studies, most notably those using individual level data, have employed actual alcoholic beverage price data (either for beer or for a composite alcoholic beverage based on a weighted average of the prices of beer, wine, and distilled spirits).

Nearly every study that includes a measure of the price of alcoholic beverages concludes that higher prices lead to significant reductions in drinking and driving. This is true not only for self-reported measures of drinking and driving, but for both nonfatal and fatal accidents related to drinking and driving. For example, Kenkel estimates that a 10% increase in price would reduce the probability of drinking and driving by approximately 7.4% for males and 8.1% for females. Moreover, he predicts even larger reductions in drinking and driving by those ages 21 years and under, with the 10% price increase expected to reduce drinking and driving by 12.6% and 21.1% for young males and young females, respectively. Kenkel's estimates from the individual level data are consistent with the predicted effects of alcoholic beverage price increases in the aggregate data. For example, a 10% increase in price is predicted to reduce overall motor vehicle accident fatalities by between 5 and 10%. Measures of fatality rates that reflect greater levels of alcohol involvement (i.e., single vehicle nighttime driver rates, BAC-based estimates of alcohol involved fatality rates) are found to be more responsive to changes in alcoholic beverage prices than overall measures of fatality rates, as expected. Similarly, price is found to have a greater impact on motor vehicle accident fatalities for younger persons, which was expected given the research that finds that youth drinking and heavy drinking is more responsive to price than adult drinking (i.e., Kenkel and that younger individuals have less experience with both driving and drinking. The estimates from studies that employ youth motor vehicle accident fatality rates predict that a 10% increase in alcoholic beverage prices would reduce youth fatalities by between 7 to 17%.

3.1.2. Alcohol Availability. Several measures of alcohol availability, an additional component of the full price of alcoholic beverages, are employed in the various econometric studies of drinking and driving. Studies of youth and young adult drinking and driving, as well as many of those that look at other age groups, include a measure of the minimum legal drinking age for alcoholic beverages. Higher minimum legal drinking ages are expected to increase the amount of time a youth spends obtaining alcohol, whether it results from spending additional time and money to obtain fake identification or from spending time finding a store that does not demand proof of age.

Virtually every study that examines the impact of drinking ages on youth drinking and driving concludes that higher minimum legal drinking ages significantly reduce self-reported drinking and driving as well as fatal accidents related to drinking and driving. Kenkel, for example, predicts that a nationally uniform legal drinking
age of 21 years for all alcoholic beverages—an increase of about 2 years in the
average legal drinking age for his sample—would have reduced self-reported
drinking and driving among young males by 14% and among young females
by 21% in 1985. Similarly, Chaloupka et al. predict that had a uniform
drinking age of 21 years been in effect for the years 1982 through 1988, motor
vehicle accident fatalities among 18- to 20-year-olds would have been reduced
by just over 3% per year. In contrast, they predict that a uniform age of 18
years would have raised fatalities in this group by nearly 10% per year.

Another commonly used measure of availability captures localities that
prohibit the sale of alcoholic beverages ("dry areas") or other limits on alco-
holic beverage sales (i.e., restrictions on sales for on-premise consumption).
Some have argued that these types of restrictions encourage more driving and
increase the likelihood of drinking and driving (the same argument can be
made for higher drinking ages leading to more underage drinking and driving
by youth living in high drinking age states but who live near low drinking age
states). However, most have argued that these types of limits on availability
significantly increase the time and travel costs associated with obtaining alco-
hol, which should reduce consumption and related outcomes.

Several of the studies using state aggregates have included a variable
measuring the fraction of the state population that resides in dry areas in an effort to examine the impact of availability on motor vehicle accidents.
Others have used an indicator for dry counties in studies employing county
level data for a single state over time. These studies produce consistently
strong evidence that restricting the availability of alcoholic beverages leads to
significant reductions in motor vehicle accident fatality rates.

Jewell and Brown, in their study using data on 254 Texas counties,
present some interesting estimates of the responsiveness of various accident
rates to changes in time and travel costs associated with obtaining alcoholic
beverages. They estimate that a 10% increase in the time and travel costs leads
to a 4.5% reduction in the probability of a fatal accident and a 5.6% reduction
in the probability of a fatal or nonfatal accident. These estimates are consistent
with the range estimated for the effects of the money price of alcoholic bev-
erages on fatal accidents.

Several recent studies have included indicators for states with dram shop
laws as an additional measure of availability. Dram shop laws are expected
to reduce availability, since these laws hold the person or establish-
ment that served the alcohol liable for the damages caused by intoxicated
patrons. In general, these studies find that dram shop laws significantly re-
duce the probability of a fatal motor vehicle accident, supporting the hypothe-
sis that these laws are effective in reducing the availability of alcohol.
In general, the dram shop laws are found to have less of an impact on drinking
and driving by youth. Chaloupka et al. argue that this is to be expected,
given that underage drinkers are likely to have difficulty being served in the
on-premise drinking establishments where the dram shop laws are expected
to have their greatest impact.
3.1.3. Laws Related to Drinking and Driving. Several recent studies have attempted to analyze a wide variety of state legislation and other activities related to drinking and driving.\textsuperscript{5,16--21,24--26,28} The expected legal costs of drinking and driving (a component of the full price of alcohol) will rise with increases in the expected probabilities of apprehension and conviction as well as with an increase in the penalties imposed upon conviction. The use of sobriety checkpoints, increased police activity, open container laws, and laws allowing the prearrest use of a preliminary breath test to establish probable cause for a driving under the influence (DUI) arrest are likely to raise the probability of detection and apprehension of drunk drivers. Similarly, per se illegal laws, which make it an offense to operate a motor vehicle with a BAC level above some specified level (generally 0.10%), and no plea bargaining laws are likely to significantly increase the probability of conviction for DUI. Finally, administrative per se laws and mandatory minimum penalties can raise the penalties upon either arrest or conviction for DUI.

In general, there is little, if any, consensus produced in the numerous studies of the impact of DUI laws on motor vehicle accident fatalities related to drinking and driving. For example, estimating fixed effects models with state level data from 1975 through 1986, Evans, Neville, and Graham\textsuperscript{6} conclude that none of their individual measures (including preliminary breath tests, sobriety checkpoints, no plea bargaining provisions, mandatory jail sentences, illegal per se laws, open container laws, and administrative license sanctions) significantly reduces drinking and driving. They do, however, suggest that there may be synergistic effects of multiple laws designed to increase the probability of detection and arrest (i.e., sobriety checkpoints and preliminary breath tests).

In contrast, Chaloupka \textit{et al.},\textsuperscript{18} using annual state aggregates from 1982 through 1988 and a more comprehensive set of laws related to DUI, conclude that several of these laws do act as deterrents to drinking and driving. For example, while existing administrative license laws with relatively weak penalties were found to have little impact, they find that a relatively severe mandatory administrative license suspension of 1 year would lead to significant reductions in fatal accidents related to drinking and driving. They make similar conclusions with respect to mandatory minimum fines and license sanctions upon conviction for DUI, although these have less of an impact than the administrative actions. Finally, they find that preliminary breath test laws and no plea bargaining provisions also deter drunk driving, while other laws—open container laws and mandatory jail sentence and community service—did not.

In the most recent comprehensive evaluation of the impact of drunk driving laws on fatality rates, Ruhm\textsuperscript{19} attempts to examine the stability of the estimated effects of these laws across a variety of model specifications. He suggests that one reason for the differences in estimates among earlier studies is that they include different sets of explanatory variables (not only for the drunk driving laws but for a variety of other factors likely to be related to
drinking and driving) and that the omission of potentially key variables in each may bias the estimates for the included variables. To at least partially address this problem, Ruhm estimates fixed effects models, which include a relatively comprehensive set of explanatory variables. In addition, he examines a variety of different model specifications to determine how the omission of some variables affects the estimates for the included variables. He does find sharp differences for the estimates obtained from alternative models specifications, with the estimated impact of some policies falling by as much as 70% when more complete specifications are estimated. Among the various drunk driving laws he examines, only the administrative per se laws are found to consistently deter drinking and driving.

3.1.4. Other Issues. In an interesting paper, Sloan and Githens24 merge automobile insurance data with self-reported individual level data on drinking and drinking and driving to examine the impact of state-mandated automobile insurance premium surcharges on the probability of drinking and driving. These surcharges could be viewed as an additional legal cost of drinking and driving and therefore as an additional component of the full price of alcoholic beverages. They conclude that these surcharges do significantly reduce drunk driving, estimating that a $1000 surcharge for the first DUI offense would reduce the probability of drinking and driving by 50% among those who drink.

3.2. Health

3.2.1. Liver Cirrhosis Mortality. One commonly used measure of long-term heavy alcohol consumption is the liver cirrhosis mortality rate. Cook and Tauchen37 were the first to use this indicator to explore the possibility that heavy drinking is responsive to price. Using annual state-level measures of per capita distilled spirits consumption and liver cirrhosis mortality rates for states that license the private sale of alcoholic beverages over the period from 1962 through 1977, Cook and Tauchen37 examine the impact of increases in distilled spirits excise taxes. They conclude that the state excise tax rate on distilled spirits has a negative and statistically significant effect on both consumption and cirrhosis mortality rates. Moreover, they estimate that a $1 increase in the distilled spirits tax would reduce per capita consumption by 6.2% and that cirrhosis deaths would fall by approximately the same amount (between 5.4 and 10.8%). Cook and Tauchen37 conclude that “liquor consumption, including consumption of heavy drinkers, is quite responsive to price” (p. 387). This finding contradicted the then-conventional wisdom that addictive alcohol consumption was not responsive to price.

More recently, Chaloupka et al.7 apply an economic model of addictive behavior3,11,12 to similar outcomes using state level data for all states of the United States and the District of Columbia from 1961 through 1984. The theoretical and empirical model employed in this research explicitly accounts for the tolerance, reinforcement, and withdrawal that distinguish the con-
sumption of an addictive substance from the consumption of a nonaddictive substance. Specifically, unlike nonaddictive models, the intertemporal linkages in the demand for addictive substances are captured by making current consumption decisions dependent on past choices. In addition, this research treats addicts as rational in the sense that they take account, at least partially, of the future consequences of their addictive consumption decisions. This is in contrast to myopic models of addiction that assume that addicts completely ignore the future implications of their addictive consumption. Perhaps the most important implication of this model is that the long-term effect of price on addictive consumption will be larger than the short-term effect.

Three outcomes related to alcohol consumption are examined: per capita distilled spirits consumption, per capita total alcohol consumption, and the age-adjusted liver cirrhosis mortality rate for the population age 30 and older (as a measure of addictive alcohol consumption). The measure of price employed in this research is an index based on the prices of the three leading brands of distilled spirits during the time period covered by the data.

Chaloupka and co-workers’ estimate indicates that per capita distilled spirits consumption and total alcohol consumption are not characterized by addictive behavior. This is not surprising, given that there are many light, moderate, and infrequent drinkers who are not addicted to alcohol. Nevertheless, aggregate alcohol demand was found to be quite responsive to price. In addition, the estimates do indicate that long-term heavy alcohol consumption, as reflected by the liver cirrhosis mortality rate, is an addictive behavior. These estimates imply a permanent 10% increase in the price of alcoholic beverages would lead to a long-term reduction of 8.3 to 12.8% in addictive consumption.

3.2.2. Other Health Consequences of Alcohol Use and Abuse. Sloan et al. examine the impact of the full price of alcoholic beverages on a variety of state level death rates related to alcohol use and abuse for the period from 1982 through 1988. The death rates were constructed from the vital statistics data on mortality for the 48 contiguous states of the United States, and capture deaths in six categories: (1) diseases where alcohol is the primary cause, as identified by the decedent’s physician (including liver cirrhosis); (2) motor vehicle traffic accidents; (3) homicides; (4) suicides; (5) diseases for which alcohol is considered an important contributory cause (includes various cancers); and (6) other accidental deaths frequently related to alcohol use and abuse (including drowning, accidental falls, fires, and others).

Sloan et al. constructed state level measures of alcoholic beverage prices from the American Chamber of Commerce Researchers Association quarterly price reports, which were adjusted to reflect changes in the relative prices of alcohol consumed at home compared to out of home during the time period covered by the sample. Various mandatory penalties for DUI conviction, dram shop laws, and alternative measures of police activity were included in the analyses as additional components of the full price of alcoholic beverages.

Sloan et al. conclude that the monetary price of alcoholic beverages
reduces some mortality rates but does not reduce deaths where alcohol is the primary cause. This is somewhat surprising, given that this measure largely consists of deaths from liver cirrhosis, which others have found to be negatively related to price.\textsuperscript{7,37} They do estimate a negative and statistically significant effect of the money price on suicides and on deaths where alcohol is a contributing cause, but they do not find that higher prices would reduce other accidents related to alcohol use. In addition, they find that alcohol availability, as reflected by dram shop laws, does have a significant effect on many of the death rates they estimate, including deaths where alcohol is the primary cause, suicides, and deaths from drowning, falls, and other accidents.

In a similar examination of the impact of alcoholic beverage prices on accidents, Ohfeldt and Morrissey\textsuperscript{38} examine the impact of beer taxes on state level measures of workplace accidents. Using data for the period from 1975 through 1985, they predict that a 25-cent increase in the beer tax in 1992 would have reduced work-loss days from nonfatal work-related injuries by 4.6 million, thereby reducing lost productivity by \$491 million. However, they found no effect of availability, as measured by the proportion of the state population in dry areas, on nonfatal workplace accidents.

### 3.3. Crime

Chaloupka and Saffer\textsuperscript{39} and Cook and Moore\textsuperscript{40} examined the impact of the full price of alcoholic beverages on various crime rates constructed from the Federal Bureau of Investigation’s Uniform Crime Reports. Similarly, Sloan et al.,\textsuperscript{25} as described above, use data from the vital statistics to examine the impact of full price on homicide death rates.

Chaloupka and Saffer\textsuperscript{39} use annual state level crime rates for the 50 states of the United States and the District of Columbia, for the period from 1975 through 1990, in their analysis of the impact of alcohol control policies on crime. Ten alternative measures of crime are employed, including: total crime, violent crime, property crime, homicide, rape, assault, robbery, burglary, larceny, and motor vehicle theft. Using the beer tax as their measure of the monetary price of alcoholic beverages, they conclude that increases in price would lead to statistically significant reductions in nearly every crime rate; the only crime they find apparently unresponsive to price is assault. Their estimates suggest, for example, that doubling the federal excise tax on beer during the period covered by their data would have reduced total crime rates by approximately 1.3\%, homicides and rapes by 3\%, robberies by 4.7\%, burglaries and larceny by 1.3\%, and motor vehicle thefts by 3\%.

Somewhat surprisingly, given that a disproportionate share of crime is committed by youths and young adults, Chaloupka and Saffer\textsuperscript{39} find no evidence that higher minimum legal drinking ages reduce crime. However, they do find strong evidence that there is a positive relationship between increased availability of alcoholic beverages and all measures of crime.

Similarly, Cook and Moore\textsuperscript{40} use the state level data from the Uniform
Crime Reports for the period from 1979 through 1987 to examine the impact of per capita alcohol consumption on violent crime rates. Using fixed effects models in which the only independent variable other than state and year indicators was the measure of alcohol consumption, they find that there is a significant relationship between consumption and assault, rape, and burglary, but do not find a significant effect of consumption on homicide. Given the literature that finds an inverse relationship between drinking and alcoholic beverage prices, they then estimate the effects of beer taxes on the various crime rates. They conclude that higher beer taxes would significantly reduce rapes and robberies, predicting that a 10% increase in the tax would lead to 1.3% and 0.9% reductions in the number of rapes and robberies, respectively.

Finally, Sloan et al.,25 using the data described above, find evidence that higher alcoholic beverage prices as well as reduced availability of alcohol significantly reduce homicides.

3.4. Educational Attainment

Two recent studies use data from the National Longitudinal Survey of Youth (NLSY) to examine the impact of alcohol use and heavy use, as well as the full price of alcoholic beverages, on educational attainment.

Yamada et al.41 use the NLSY data to examine the impact of alcohol and marijuana use by high school seniors in 1982 on the probability of high school graduation. They find strong evidence that increases in the frequency of drinking and/or marijuana use, as well as increases in the consumption of wine and distilled spirits, significantly reduce the probability of high school graduation. In addition, using the beer tax as their measure of price, Yamada et al. find that drinking by high school seniors is significantly reduced by higher alcoholic beverage prices. Using these estimates, they predict that a 10% increase in the beer tax would raise the probability of high school graduation by approximately 3%. Similarly, they conclude that higher minimum legal drinking ages would also raise the probability of high school graduation.

Cook and Moore42 use the data for the two youngest cohorts in the NLSY (those aged 14 and 15 when the survey began) as well as a subsample of these data on youth who were high school seniors in 1982 to consider the impact of drinking during high school on post-high school educational attainment. They estimate a structural model consisting of an equation for drinking that includes the beer tax and minimum legal drinking age as measures of the full price of alcoholic beverages, as well as an equation for educational attainment that includes alcohol consumption during high school. In addition, they estimate reduced form models that directly estimate the effects of beer taxes and drinking ages on educational attainment.

Cook and Moore42 find that frequent drinking during high school significantly reduces post-high school education, with high school seniors who are
frequent drinkers going on to complete 2.3 fewer years of college than their less frequent drinking counterparts. In addition, they find strong evidence that higher beer taxes and legal drinking ages are effective in reducing the frequency of drinking by high school seniors. The estimates from their reduced form model provide even clearer evidence that increases in the full price of alcoholic beverages raise educational attainment. Based on these estimates, Cook and Moore predict that, in 1982, raising the beer tax from 10 cents a case to $1 a case would increase the probability of attending and graduating from a 4-year college or university by 6.3%. Similarly, they predict that raising the minimum legal drinking age from 18 years to 21 years would raise the probability of college graduation by 4.2%.

4. Conclusions

This chapter summarized the economic research that examines the impact of the full price of alcoholic beverages on several outcomes related to alcohol use and abuse, including drinking and driving and motor vehicle accidents, health consequences of alcohol consumption, other accidents related to drinking, crime, and educational attainment. This research clearly demonstrates that increases in the monetary prices of alcoholic beverages, which could be achieved by increasing federal, state, and local alcohol taxes, can significantly reduce many of the problems associated with alcohol abuse, as well as improve educational attainment. However, alcoholic beverage prices, in large part because of the infrequent and relatively small changes in federal and state taxes, have been allowed to decline relative to the prices of other goods and services. Given the evidence discussed above, falling prices will lead to increases in many of the problems associated with alcohol use and abuse.

Other policies can be used to offset the impact of declining real prices on the consequences of alcohol use and abuse. For example, the research described in this chapter generally finds a strong positive relationship between the increased availability of alcoholic beverages and the consequences of alcohol use and abuse. Thus, efforts to reduce the availability of alcoholic beverages, including higher minimum legal drinking ages and the widespread adoption of dram shop laws, have been found to be effective in reducing motor vehicle and other accident fatalities related to drinking, crime, and other consequences of alcohol abuse.

References


