

Policy Watch

Alcohol and Cigarette Taxes

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Public policies are often made without much recourse to economic reasoning. Economists are often unaware of what is happening in the world of public affairs. As a result, both the quality of public decision-making and the role that economists play in it are less than optimal. This feature contains short articles on topics that are currently on the agendas of policy-makers, thus illustrating the role of economic analysis in illuminating current debates. Suggestions for future columns and comments on past ones should be sent to Daniel Weinberg, HHES Division, Bureau of the Census, Department of Commerce, Washington, DC 20233.

Introduction

Increased excise taxes on cigarettes and alcohol have been suggested as a means to finance (at least partially) the Clinton administration's proposed program of health care reform. From a public health perspective, these tax hikes are appealing because cigarette smoking and alcohol abuse have

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detrimental health effects. Politically, sin tax increases are increasingly acceptable, especially (in light of the sharply declining number of smokers) for cigarettes. From an economic efficiency perspective, these tax hikes may be justified because smokers and alcohol abusers impose costs on others which exceed current tax levels. From a revenue raising perspective, higher tax rates would be justified if the demand functions for alcohol and cigarettes were relatively inelastic.

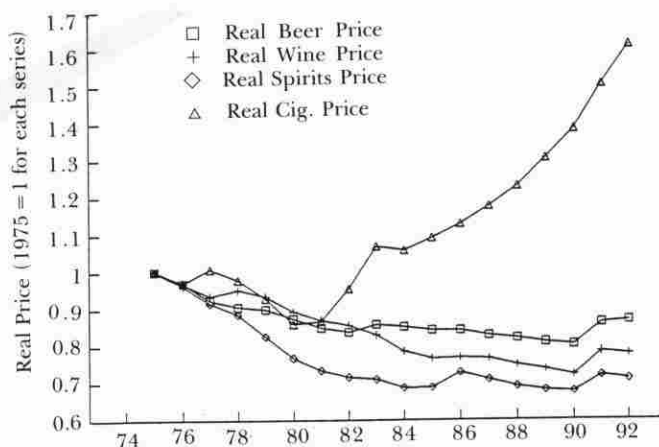
The federal excise tax rates on cigarettes and alcohol have been stable in nominal terms for long periods of time. The federal excise tax rate on cigarettes was fixed at 8 cents per pack between November 1, 1951, and the end of 1982. It rose to 16 cents per pack effective January 1, 1983, as part of the Tax Equity and Fiscal Responsibility Act of 1982. The tax was increased further to 20 cents per pack effective January 1, 1991, and to 24 cents per pack effective January 1, 1992, as part of the Omnibus Budget Reconciliation Act of 1990. But if the tax had simply been adjusted for inflation since 1951, it would be 42 cents per pack today.

January 1, 1991, marked the first increases in the federal excise tax rates on beer and wine since November 1, 1951. In addition, the tax rate on distilled spirits—increased by about 19 percent effective October 1, 1985, as part of the Deficit Reduction Act of 1984—was raised for only the second time since 1951. As part of the Omnibus Reconciliation Act of 1990, the tax on beer doubled from 16 cents per six-pack to 32 cents, the tax on wine jumped from just over 3 cents per 750 milliliter bottle to about 21 cents, and the tax on a 750 milliliter bottle of 80 proof distilled spirits rose from \$1.98 to \$2.14. But the distilled spirits tax rate would have to be 75 percent higher and the beer tax rate would have had to be 162 percent higher to maintain their real values as of 1951.¹

Since the first Surgeon General's Report on Smoking and Health in 1964, federal and state governments have carried out policies designed to increase public knowledge about the harmful effects of smoking, along with restrictions on advertising by cigarette manufacturers, and assuring no-smoking areas in public places and in the workplace. A similar campaign to reduce alcohol-involved motor vehicle deaths dates to the mid-1970s, a program which has included higher minimum legal ages for the purchase and consumption of alcoholic beverages, and stricter penalties for drunk driving. The relative stability of tax rates on cigarettes and alcohol is somewhat inconsistent with these campaigns (Grossman, 1989; Grossman et al., forthcoming). In fact, the real prices of alcohol and cigarettes (their prices after accounting for the effects of inflation) have declined significantly for long periods during which the

¹The average U.S. federal and state tax on a pack of cigarettes in 1992 was lower than any other developed country except Spain (Coalition on Smoking OR Health, 1993). The U.S. taxes beer and wine at rates significantly below the average rates imposed by developed countries, while it taxes spirits at about the average rate (Sparrow et al., 1989). Analyses of the sources of these differences and their impacts on the consumption must take account of the political setting in which these rates are determined and cultural attitudes towards smoking and drinking (Laugesen and Meads, 1991; Saffer, 1991).

Figure 1
Real Alcohol and Cigarette Prices, 1975–1992



Source: Distilled spirits prices from 1975 through 1977 are based on the whiskey price index. Alcoholic beverage prices and the Consumer Price Index for all items are from Bureau of Labor Statistics, U.S. Department of Labor, *Monthly Labor Review*, various issues and *Consumer Price Index—Detailed Report*, various issues. Cigarette prices are from the Tobacco Institute, *The Tax Burden on Tobacco*, Volume 27, Washington, D.C., 1992. All four prices include federal and state excise taxes.

Revenue Potential of Cigarette and Alcohol Tax Hikes

Two alternative proposals to increase the federal excise tax on cigarettes have been discussed extensively since President Clinton formed his Task Force on National Health Care Reform last January: an increase from 24 cents a pack to 48 cents a pack and an increase to \$2.24 a pack. The Congressional Budget Office (1993) estimates that the former policy would increase tax revenue from the \$5 billion figure yielded by the 24-cent tax in 1992 to \$8 billion in the first year of the tax hike. This projection is based on a demand function for cigarettes with a constant price elasticity equal to $-.40$ (personal conversation with Frank Sammartino of CBO).

Based on unstated assumptions, the Congressional Joint Committee on Taxation estimates that a \$2 a pack tax hike would yield \$18 billion a year in

²The real price of cigarettes fell by 15 percent between 1975 and 1980 (and by 20 percent between 1965 and 1980) before rising by 62 percent between 1980 and 1990. One factor in this trend is that the legislation which raised the federal excise tax from 8 cents to 16 cents in 1983 contained a clause which provided for the resumption of the old 8 cent rate at the end of fiscal 1985. After a half-dozen temporary extensions, Congress made the 16 cent rate permanent in 1986. Harris (1987) argues that part of the trend can be explained by viewing the tax increase as a coordinating device for oligopolistic price increases. Becker, Grossman, and Murphy (1993) attribute it to monopolistic pricing behavior by the producers of an addictive good faced with expected future declines in the demand for smoking.

additional revenue (unpublished memorandum). Using a lower and constant price elasticity of approximately $-.50$, Harris (1993) offers computations that indicate a revenue increase of \$28 billion. Based on the cigarette demand functions obtained by Becker, Grossman, and Murphy (1993) and by Chaloupka (1991), Grossman (1993) predicts that a tax rate of \$1.26 a pack would maximize federal revenue from the excise tax at \$16 billion. Higher tax rates, such as the \$2.24 suggested by Harris, would yield less additional revenue than the \$11 billion generated by a tax hike of \$1.02 from 24 cents to \$1.26. Grossman's computations are based on a linear demand function, rather than one with a constant elasticity, so that the higher taxes at some point lead to such substantial decreases in demand that total tax revenue falls.³

The pure alcohol in one ounce of distilled spirits is currently taxed at about 21 cents, which is substantially higher than the 10 cents per ounce for beer or 8 cents per ounce for wine. Before the 1990 legislation was enacted, the Bush administration proposed taxing the pure alcohol in any alcoholic beverage at 25 cents per ounce. This policy would raise the tax on a 750 milliliter bottle of distilled spirits from \$2.14 to \$2.54, the tax on a six-pack of beer from 32 cents to 81 cents, and the tax on a 750 milliliter bottle of table wine from 21 cents to 70 cents. Clinton administration officials have revived the proposal, although the president has not supported it.

The Congressional Budget Office (1993) estimates that such a tax increase would increase federal revenue from alcohol excise taxes from the \$8 billion figure yielded by the current taxes to \$12 billion in the first year. Higher beer tax revenue accounts for 73 percent of this \$4 billion increase, with higher wine and spirits revenue accounting for 19 percent and 8 percent, respectively. These projections assume constant price elasticities of demand for beer, wine, and spirits equal to $-.30$, $-.70$, and $-.80$, respectively. They also assume no cross substitution among beverages (personal conversation with Frank Sammartino of CBO).

Effects on Consumption and Related Outcomes

Much of the research on how prices of alcohol and tobacco affect consumption capitalizes on the substantial variation in their prices across states, primarily because of the very different state tax rates on these goods. It controls in a variety of ways for factors such as pro- and anti-smoking or drinking sentiment

³One may question the use of a linear demand function for global, optimal tax calculations. But it is equally questionable to forecast the impacts of large tax hikes by using a demand function with a constant elasticity that is smaller than one, particularly since the long-run price response or elasticity exceeds the short-run elasticity in the case of addictive goods such as cigarettes (see the next section). Grossman's computation takes account of this difference and pertains to the long-run revenue yield. In the short-run the revenue yield would be larger. Strictly speaking, a present value measure is required to summarize the revenue yield. Since the precise adjustment period is not known and since annual estimates are presented by other forecasters, Grossman does not make present value computations.

that may jointly determine tax rates and consumption. Before turning to a discussion of this research, we must address some conceptual issues.

First, cigarette smoking and alcohol use are not linked to adverse health consequences in the same way. There is overwhelming evidence that smoking has detrimental health effects. One can usefully focus on whether and how much individuals smoke since these measures are highly correlated with the smoking-related costs of interest. With alcohol, the situation is more complex. Unlike cigarettes, many persons regularly consume small quantities of alcohol. Most individuals who consume alcohol do not harm themselves or others; indeed, some evidence suggests that moderate alcohol consumption lowers the risk of coronary heart disease in men (Rimm et al., 1991). Instead, the adverse effects of alcohol spring from overuse (cirrhosis of the liver) or misuse (drunk driving crashes). For these reasons, we emphasize outcomes other than per capita alcohol consumption by all segments of the population.

Second, since current consumption is positively related to past consumption for addictive goods, the response to higher taxes grows over time. For example, a hike in the price of cigarettes in 1993 would reduce consumption in 1993, which would cause consumption in 1994 and all future years to fall.⁴ Under certain circumstances, the long-run price elasticity rises as the degree of addiction rises (Becker, Grossman, and Murphy, 1991; Becker, 1992).

Third, it is important to focus on teenagers and young adults, because cigarette smoking and alcohol abuse are addictive behaviors that generally begin early in life. Thus, policies to prevent their onset might be the most effective means to reduce them in all segments of the population (Mullahy and Sindelar, 1990b; forthcoming). The focus on the younger age group is particularly urgent for alcohol, because motor vehicle accident mortality is the leading cause of death of persons under the age of 35, and alcohol is involved in over half these fatal accidents (National Highway Traffic Safety Administration, 1986). Youths are more sensitive to changes in money prices of addictive goods, whereas adults respond more to changes in the perceived or actual harmful consequences that take place in the future. This is because future costs tend to be less important to younger consumers since they have lower time discount factors, and because youths have more stringent budget constraints. Interactions between peer pressure and addiction also predict greater price sensitivity by youths. Bandwagon or peer effects are much more important in the case of youth smoking or alcohol consumption than in the case of adult smoking or alcohol consumption. To the extent that higher taxes help prevent a bandwagon effect, such taxes will have larger effects on youth.

⁴Indeed, studies based on the "rational addiction" framework (Becker and Murphy, 1988) have considered the demand function for an addictive good as negatively related to its price in that period, but positively related to past and future consumption. Chaloupka (1991), Becker, Grossman, and Murphy (1993), and Chaloupka, Grossman, Becker, and Murphy (1993) use estimates of this type of demand function to compute long-run and short-run price elasticities of demand for cigarettes and excessive alcohol consumption.

Cigarette demand functions estimated in the context of the rational addiction model (Becker and Murphy, 1988) yield long-run price elasticities for per capita consumption (at the mean values of consumption and price) that range from $-.45$ to $-.75$. The corresponding range of short-run price elasticities is $-.20$ to $-.45$ (Chaloupka, 1991; Becker, Grossman, and Murphy, 1993; Keeler et al., 1993). Clearly, an increase in the federal excise tax rate on cigarettes is a potent policy to curtail smoking.

Higher cigarette prices may result in diverse changes in smoking behavior. Some smokers maintain their rates of smoking by substituting discount brands—which now account for almost one-third of the cigarette market—for the more expensive name brands. Smokers who reduce the number of cigarettes consumed may compensate by switching to higher tar and nicotine brands, by inhaling more deeply, or by reducing idle burn time. But more than half of the effect of a higher price on cigarette consumption is due to a reduction in the number of smokers (Lewit, Coate, and Grossman, 1981; Lewit and Coate, 1982; Wasserman et al., 1991), so the factor of more intense smoking can be given fairly minor weight in evaluating the impact of excise tax changes.

The demand elasticity studies also indicate that the elasticities for youth participating in smoking are larger than adult smoking participation elasticities. The relevant figures are -1.20 for youths aged 12–17, $-.74$ for 20–25 year olds, $-.44$ for 26–35 year olds, and $-.15$ for persons above the age of 35 (Lewit, Coate, and Grossman, 1981; Lewit and Coate, 1982).⁵ Because of its effect in discouraging teenage smoking participation, a tax increase that is maintained in real terms over a period of several decades could decrease aggregate smoking substantially.

With regard to youth alcohol consumption, the incidence of frequent consumption and the incidence of heavy consumption appear inversely related to the price of alcohol (Grossman, Coate, and Arluck, 1987; Coate and Grossman, 1988; Kenkel, 1992; Grossman et al., forthcoming).⁶ Kenkel (1993)

⁵Wasserman et al. (1991) contradict the conclusion that youth smoking is more responsive to price than adult smoking. Their study should be interpreted with caution for reasons indicated by Grossman (1991). Ferrence et al. (1991) report that recent Canadian tax hikes on cigarettes have caused substantial declines in teenage smoking participation rates in that country. As more studies dealing with the price sensitivity of teenage smoking are undertaken, the conclusions reached above may have to be modified. Since smoking participation rates rise with age, larger smoking participation elasticities do not necessarily translate into larger declines in smoking participation rates when price rises. According to the elasticities cited in the text, a 10 percent increase in price would lower smoking participation rates of 12–17 year olds, 20–25 year olds, 26–35 year olds, and persons over the age of 35 by 2 percentage points, 3 percentage points, 2 percentage points, and less than 1 percentage point, respectively. Based on this measure, persons under the age of 36 are more responsive to price than older persons.

⁶Grossman et al. (forthcoming) estimated the consequences for youth if the federal excise tax rate on beer—the alcoholic beverage of choice among youth—had been indexed to the rate of inflation since 1951. This policy would have reduced the number of high school seniors who drank frequently (more than 30 times) in the past year (21 percent of all seniors) by 45 percent, the number who drank frequently (more than 9 times) in the past month (16 percent of all seniors) by

reports that the price elasticity of demand for the heavy drinking outcome is $-.92$ for persons 18 years of age and older, while it is -2.24 for youth between the ages of 18 and 21. This suggests that young drinkers, like young smokers, are quite sensitive to price. Kenkel also reports a strong positive association between the number of days with five or more drinks of alcohol in the past year and the reported number of occasions of drunk driving in the past year.

Alcohol abuse can cause deaths in motor vehicles and from liver cirrhosis and other diseases. If the federal excise tax on beer had been indexed to the rate of inflation since 1951, the lives of about 1,022 youths aged 18 to 20 who died in motor vehicle accidents would have been saved in a typical year in the 1975-81 period (Saffer and Grossman, 1987). Chaloupka, Saffer, and Grossman (1993) report that the beer tax policy would have had an even larger effect in the 1980s, saving about 1,660 lives per year in the 1982-88 period. The same policy would have prevented over 5,000 people of all ages from being killed annually in fatal motor vehicle crashes.

Cook and Tauchen (1982) report that a \$1 increase in the state excise tax rate on a gallon of distilled spirits lowers the age-adjusted cirrhosis mortality rate by approximately the same percentage as it lowers per capita consumption of distilled spirits. In the context of the rational addiction model, Chaloupka et al. (1993) find that the long-run price elasticity of demand for distilled spirits is -1.00 , substantially larger than the short-run elasticity of $-.79$. The estimates indicate either that heavy drinkers greatly reduce their consumption when alcohol becomes more expensive or that the number of heavy drinkers is sensitive to the price of alcohol.

Along with these deaths, alcohol abuse has a number of other harmful side-effects. Chaloupka and Saffer (1992) and Cook and Moore (1992b) find that increases in alcoholic beverage excise tax rates would lead to significant reductions in crime rates. For example, Chaloupka and Saffer predict that a doubling of the federal beer tax would reduce total crimes by approximately 1.3 percent, murders by 3 percent, rapes by 3 percent, robberies by 4.7 percent, and burglaries and thefts by 1.3 percent each. Ohsfeldt, Morrissey, and Henderlite (1991) estimate that a 12 percent increase in the beer tax in 1989 would have resulted in about 130,000 fewer industrial injury cases among full-time workers. Furthermore, the tax increase would have lowered work-loss days resulting from industrial injuries by 1.5 million in 1989. Cook and Moore (1992a) document that school completion rates are positively related to state beer tax rates.

Some concern has been expressed that raising the price of alcohol may lead to the substitution of illegal drugs. For example, Chaloupka and

43 percent, and the number with at least one heavy drinking episode (consumption of five or more drinks) in the past two weeks (40 percent of all seniors) by 18 percent. These declines are greater than those associated with an alternative policy simulation: a uniform legal drinking age of 21 in all states of the United States in 1982.

Laixuthai (1992) and DiNardo and Lemieux (1992) find that marijuana and alcohol are substitutes. But the lower motor vehicle mortality rates in states with relatively high beer excise tax rates suggest that, while marijuana may have some impact on the ability to drive an automobile, any substitution does not offset the gains from reducing alcohol consumption.

Indirect Costs, External Costs, and Optimal Sin Taxes

The optimal rate of taxation for cigarettes and alcohol is hotly debated. Public health officials often favor imposing taxes to help people help themselves to adopt healthier behaviors. Economists tend to argue that if individuals are informed about their choices and yet still choose to consume cigarettes and alcohol, consumer sovereignty should reign, and taxes should be imposed only to correct for externalities. Still others argue for maximizing tax revenue, or collecting revenue in a manner that minimizes welfare losses due to price distortions.

In their penetrating and comprehensive study of the external costs of smoking and drinking, Manning et al. (1989, 1991) point out that the principal common external cost of these behaviors, and the most important external cost of smoking, is the fact that premiums paid by smokers and alcohol abusers for health and life insurance do not fully reflect their excess use of medical care services and their higher probability of premature death.⁷ While many external costs will be captured by thinking about the consequences in the insurance market, others will not. Consider, for example, a sober passenger who knowingly agrees to ride in a motor vehicle operated by an intoxicated driver: If the driver causes a crash in which the passenger is killed, is this premature death an external cost of alcohol abuse, or was the risk taken voluntarily (and thus internalized) by the passenger?

Other controversial issues arise for both smoking and drinking. Is the harm done to their fetuses by pregnant women who smoke and drink excessively an external cost? What about the detrimental health effects suffered by nonsmokers from secondhand smoke, estimated to include annually roughly 3,000 lung cancer deaths as well as a host of other respiratory illnesses (U.S. EPA, 1992)? Manning et al. (1989, 1991) treat most of the costs associated with such outcomes as internal costs. Hay (1991) criticizes this treatment, possibly because the decisions at issue are made with less than full information. The extent to which information is imperfect is yet to be resolved. Individuals are likely to be aware of some costs, like passive smoking and fetal alcohol syndrome, yet may overestimate others. For instance, Viscusi (1992) cites survey results that both smokers and nonsmokers overestimate the probability of death and illness from tobacco, and that teenagers attach a higher risk to smoking than the rest of the population.

⁷This external cost is net of smokers' and alcohol abusers' implicit pension transfers to other persons.

Even if smoking, drinking, and imperfect information engender costs that are ignored by consumers, government intervention in general—and taxation in particular—are not necessarily the best remedies. For example, parents may be better able to internalize the costs ignored by their children than the government. Further, more vigorous enforcement of laws restricting the use of tobacco in public places (Viscusi, 1992) or of drunk driving laws may be preferable to higher tax rates, although the costs of enforcement may favor the tax policy. These issues will continue to be debated.

With these warnings in mind, we present some estimates of the social costs and implied optimal tax rates on cigarettes and alcohol. These tax rates are from the perspective of taxing to correct for externalities. Manning et al. (1989, 1991) estimate that a tax of 19 cents on a pack of cigarettes would have equaled the per pack external cost of smoking (in 1991). This figure excludes the costs of low birthweight and passive smoking, which might be measured by the cost of premature death and the cost of neonatal intensive care. If these costs are treated as externalities, the optimal tax becomes 65 cents, and this upper-bound figure exceeded the average federal and state tax of 44 cents on a pack of cigarettes in 1991. Based on these estimates, a tax hike in excess of 24 cents could not be justified on externality grounds. However, Manning et al. exclude the long-term intellectual and physical developmental consequences of low birthweight. Hay (1991) estimates that the inclusion of these costs raises the optimal tax to more than \$4.80 a pack. Clearly, the range of choice here is considerable, particularly since programs to modify the behavior of pregnant women who smoke are alternatives to a broad-based cigarette tax.

The story with respect to alcohol is somewhat different. Based on external cost estimates in a study by Harwood et al. (1984), Pogue and Sgontz (1989) and Saffer and Chaloupka (1992) estimate the optimal tax on alcohol in 1991 at \$73 and \$79 per gallon of pure alcohol, respectively. Based on similar cost estimates by Manning et al. (1989, 1991), Blumberg (1992) obtains an optimal tax of \$73 per gallon. Although these studies examine differing estimates of the costs of alcohol abuse, all conclude that the optimal tax is significantly greater than the average federal and state tax of \$35 per gallon of pure alcohol. The studies also take account of the welfare losses suffered by consumers who do not abuse alcohol when the tax rate rises.⁸

Revenue yield and the fact that sin taxes tend to be regressive must also be considered in setting optimal tax rates. If the aim of tax hikes is to correct for externalities, small changes in individual income tax rates could easily compensate for the effect of increased excise taxes on the distribution of income (Manning et al., 1989). But if revenue yield also is important, offsetting tax cuts are not a viable option. Moreover, the fairness standard described by Cook and

⁸To maintain the optimal alcohol tax in real terms after 1991, it would have to be indexed to the rate of inflation. The same objective could be accomplished by converting to an ad valorem alcoholic beverage excise tax system under which the tax rate is expressed as a fixed percentage of the manufacturer's price. The Congressional Budget Office (1993) points out that the latter option might induce manufacturers to lower sales prices to company-controlled wholesalers to avoid part of the tax. Similar comments apply to optimal cigarette taxes.

Moore (forthcoming) calls for smokers and drinkers to pay for the full costs of their behavior regardless of whether taxes are levied to raise revenue or to correct for externalities.

The conventional view is that alcohol and cigarettes are attractive targets from Ramsey's (1927) standard of efficient taxation. As shown by Ramsey, under certain conditions the way to raise a fixed amount of revenue while minimizing welfare losses due to price distortions is to tax inelastically demanded goods more heavily. While fairly inelastic in the short run, the estimated price elasticities of cigarette smoking and heavy alcohol consumption cited earlier (which were based on theories of rational addiction) imply that in the long run these behaviors may be no less sensitive to price than other goods. An alternate efficiency argument is that goods that are complements to leisure should be taxed at higher rates to offset the disincentive effects of income taxation of labor supply (Corlett and Hague, 1953); indeed, Cook and Moore (forthcoming) argue that the negative effects of excessive alcohol consumption on earnings and investment in human capital documented by Mullahy and Sindelar (1989, 1990a, 1993) suggest that alcohol is a complement for leisure. In any case, there is no particular relationship between the optimal tax rate to correct for externalities and the tax rate required to yield a given amount of revenue while minimizing welfare losses due to price distortions.

The bulk of the evidence presented here does support higher taxes on cigarettes and alcohol. It should be remembered, however, that an "optimal" tax rate for these commodities cannot be defined without reference to one's particular perspective and objectives—enhancing public health, maximizing tax revenues, or properly pricing external effects—and that political value judgments are involved throughout (for example, should regressive taxes be used to raise revenue?). In addition, with both cigarette and alcohol taxes, a primary unresolved issue relates to what harmful consequences should be classified as external. For alcohol in particular, an important open question is how to enact taxes focused on the abusers of alcohol, while avoiding undue costs for the majority of drinkers who do not abuse alcohol.

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