Methodology

Modeling individual impacts of changes in state alcohol prices

The U.S. Community Preventive Services Task Force recommends increasing alcohol excise taxes to reduce excessive alcohol consumption and related harms. For this analysis, alcohol consumption was assessed using data from the 2011 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an annual, state-based, random-digit-dial landline and cellular telephone survey of noninstitutionalized U.S. adults ≥18 years that collects information on health risks and health outcomes. The survey is conducted monthly in all states, the District of Columbia (DC), and three U.S. territories, and is coordinated by the Centers for Disease Control and Prevention (www.cdc.gov/brfss).

The BRFSS includes three questions to estimate the prevalence of alcohol consumption in the past 30 days. These questions assess the number of drinking days, the average number of drinks consumed on drinking days, and the number of binge drinking episodes (defined as five or more drinks per occasion for men; four or more drinks per occasion for women). To calculate a respondent’s average daily alcohol consumption, the number of drinking-days in the past 30 days was multiplied by the average number of drinks consumed per drinking-day, and then divided by 30.

For this analysis, excessive drinkers were defined as those reporting any of the following: binge drinking; heavy drinking (average daily consumption of ≥2 drinks per day for men or ≥1 drink per day for women); or any alcohol consumption among those aged 18-20 years. Non-excessive drinkers were defined as drinkers who did not meet criteria for excessive drinking.

The total increase in annual alcohol costs (inclusive of beverage price plus taxes) to individuals was based on a series of hypothetical tax increases measured on a per-drink basis ($0.05, $0.10, and $0.25 per drink), and as 5% of the current price of a drink. These tax increases were assumed to have been applied to all alcoholic beverage types (i.e., to beer, wine and liquor). The cost of an average drink by beverage type was based on data from Impact Databank, and weighted by state-level beverage consumption (the proportion of drinks consumed in each state in the form of beer, wine and liquor).

A basic law of economics is that when products become more expensive, people tend to purchase less of them, and this same basic principle holds true for alcohol as well. Using an economic measure called price elasticity, one can calculate how many fewer drinks a person would consume each year given a particular tax increase. The total cost on an alcoholic beverage, including the retail price plus taxes were estimated before and after a tax increase, and the net cost from a hypothetical tax increase was determined by
subtracting total alcohol-related costs before a tax increase from the total alcohol-related costs after a tax increase.

Per capita costs (i.e., the additional costs to an individual drinker) and aggregate costs (i.e., additional costs summed for a particular group) were assessed based on alcohol consumption levels (excessive vs. non-excessive drinkers); household income levels (<$25,000, $25,000-$49,999, $50,000-$74,999, ≥$75,000); and employment status (employed for wages vs. not employed). Persons who were classified as “not employed” included those who were homemakers, self-employed, unemployed, unable to work, retired, or students.

Modeling employment impacts of changes in state alcohol prices

Taxes on alcoholic beverages can reduce alcohol consumption and alcohol-related harms, while generating revenues for cities and states. The impact of alcohol tax increases on jobs was assessed using the Regional Economic Models, Inc. (REMI) simulation model and information obtained from multiple data sources. Key steps and assumptions used in the REMI modeling:

- Used a detailed 169-sector version of the model which included the alcoholic beverage industry
- Modeled four alternative tax scenarios - $0.05, $0.10 and $0.25 per drink increases in excise taxes and 5% sales tax on alcoholic beverages
- Assumed that all tax increases are fully passed on to consumers
- Assumed that net-of-tax alcoholic beverage prices were constant within and across states
- Assumed that differences in prices across states result from differences in state taxes on alcoholic beverages
- Modeled alternative scenarios for spending new tax revenue (using funds to pay for general government services or to specifically pay for health care services).

Key parameters used in the REMI modeling:

- Pre-tax alcoholic beverage prices were assumed constant at $3.14 for a six-pack ($5.58/gallon), $4.35 for a fifth of wine ($21.80/gallon), and $9.04 for a fifth of liquor ($45.20/gallon). (Source: NIAAA’s Alcohol Policy Information System (APIS) 2011.)
- State shipment data was used to estimate the pre-tax increase in alcohol consumption levels in each state. (Source: Brewers Almanac 2011.)
- Additional taxes were added to current state alcohol taxes. (Source: APIS 2011.)
- Beverage-specific elasticity of demand was assumed to be -0.50 for beer, -0.64 for wine, and -0.79 for spirits. (Source: Guide to Community Preventive Services.)
• Assumed no cross-price elasticity of demand (i.e., substitution of one beverage type for another) given lack of reliable estimates
• Markups assumed to be constant for alcohol retailing at 26.9%, for alcohol wholesale at 25.9%, and for on-premises retail alcohol outlets (e.g., bars and restaurants) at 9.0%. (Source: the Economic Census.)

Estimation with the REMI model:

• The impact of alcohol tax increases on employment was directly modeled for five states: Arkansas, Florida, Massachusetts, New Mexico, and Wisconsin. These states were selected to provide geographic diversity and to assess the impact of tax changes in states with different levels of employment in the manufacturing and distribution of alcoholic beverages.
• In these states, the net impact of alcohol tax increases on jobs was calculated based on expected changes in the purchasing of alcoholic beverages and other goods and services by individual drinkers, as well as the impact of the spending new alcohol tax revenues by state and local governments.
• New tax revenues in these states were assumed to either be spent on general government services based on existing funding patterns, or, in an alternative scenario, on health care services, consisting of office visits to health practitioners (North American Industry Classification System (NAICS) 6211-6213); outpatient, laboratory, and other ambulatory care services (NAICS 6214, 6215, 6219); home health care services (NAICS 6216); hospitals (NAICS 622); and nursing and residential care facilities (NAICS 623).

Extension to other states and DC

• Estimates for the remaining 45 states and DC were extrapolated from the five states where direct modeling was done, using multivariate models that included six independent variables and their squared terms.
• The independent variables for the general funds scenario included the following: estimated state revenue generated from the tax (tax and price from APIS 2011, shipment from Brewers Almanac 2010); estimated state loss of sales to the alcohol industry (tax and price from APIS 2011, shipment from Brewers Almanac 2010); state gross domestic product (GDP) for all private industries (Bureau of Economic Analysis 2007); state GDP for wholesale and retail trade (Bureau of Economic Analysis 2007); state GDP for state and local governments (Bureau of Economic Analysis 2007); and state total employment in state and local government (2007 Census of Governments)
• The independent variables for the health care reallocation scenario included the following: estimated revenue generated from the tax (tax and price from APIS 2011, shipment from Brewers Almanac 2010); estimated loss of sales within
alcohol industry (tax and price from APIS 2011, shipment from Brewers Almanac 2010); state GDP for all private industries (Bureau of Economic Analysis 2007); state GDP for whole sale and retail trade (Bureau of Economic Analysis 2007); state GDP for ambulatory health care services, and hospitals and nursing and residential care facilities (Bureau of Economic Analysis); and state employment in health care NAICS (2007 Economic Census).