DATA AND ASSUMPTIONS (TAX CALCULATOR REVISION, MARCH 2017)

Taxes on sugary drinks can generate considerable revenue for states, cities, and the nation. The revised Revenue Calculator for Sugary Drink Taxes estimates potential state or city revenues from a range of excise taxes on sugary drinks (i.e., beverages with added caloric sweeteners). The calculator is built on several assumptions and multiple data sources.

DATA

Beverage Sales Data

We use proprietary industry data from the Beverage Marketing Corporation (BMC) on total sales of packaged and fountain beverages sold across all retail channels in the United States. The data is based on annual gallonage **(volume of gallons sold)** for the total year of **2015**, including sales of carbonated soft drinks (CSDs) or sodas, fruit drinks, sports drinks, ready-to-drink (RTD) tea, enhanced water, energy drinks, and RTD coffee. The BMC licenses data separately for each beverage category at the regional and/or national level. Note that powders (e.g., fruit drink powder mixes) are not included in our estimation. Beverage sales are assumed to represent beverage consumption.

Regional 2015 gallonage data is used for all beverages, except enhanced water where only national-level data is available. The BMC defines 7 regional markets for CSDs and fruit drinks, including the Northeast, East Central, West Central, Pacific, South, Southwest, and West (see **Table 1** below for a list of states across regional markets). The BMC defines 4 regional markets for sports drinks, RTD tea/coffee and energy drinks, including the Northeast, Midwest, South, and West (see **Table 2**).

This estimation considers **only** an excise tax on sugary drinks, also referred to as regular varieties or drinks. Zero-calorie/reduced calorie beverages such as diet drinks are **not** currently included in our estimation. We use licensed BMC data on the share of diet vs. regular drinks for each beverage category in 2015. Only for CSDs, this data is available from the BMC at the regional level; other beverages are assessed for percent of zero/reduced calorie drinks at the national level. The BMC defines diet beverages depending on how they're marketed by companies as well as calories per serving, typically using 40 calories per eight-ounce serving as a threshold (0-40 are diet, 41+ are non-diet or regular).

Per-capita beverage sales across states and cities are determined by per-capita sales within their regional markets, which are further adjusted for each state/city up or down based on their socio-demographic composition. We use the 24-hour dietary recall data from the National Health and Nutrition Examination Survey (NHANES) 2013-2014 to assess consumption of each sugary drink type (e.g., sport drinks, soft drinks, etc.) by age, race/ethnicity and education. We match the Census and NHANES categories on education (less than high-school, high school, some college or associate, and college or more), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other races), and age (0-9, 20-44, 45-64 and 65+). The adjustment weighs differences in sugary drink consumption by education most heavily, but also accounts for variation by race/ethnicity and age.

Changes in beverage volume over 2017-2020 are based on the BMC projected gallonage sales for 2020. Based on these BMC projections, a compound annual growth rate is calculated for 2015-2020. We apply this rate in projections of annual changes for 2016 through 2020, reporting data for 2017 through 2020.

Population Data

We project state and city population for 2016-2020 based on the 2010 U.S. Census data, U.S. Census Bureau, Population Division population estimates for 2015, and annual rate of change between 2010 and 2015 (assumed to be the same for 2016-2020 predictions). We use the U.S. Census 2011-2015 American Community Survey 5-Year Estimates on the socio-demographic composition of the resident population by state and city and using the categories described above. All customers are assumed to be subject to the same tax rate, i.e., there are no exclusions or reduced rates for any customers.

Beverage Prices

Retail prices in 2017 dollars for CSDs, fruit drinks, sports drinks, energy drinks and enhanced water are based on the data from the Bridging the Gap Community Obesity Measures Project (BTG-COMP). The BTG-COMP SSB price estimates are computed based on data drawn from food store and fast food direct observation audit instruments that were used to collect data in

2010, 2011, and 2012 in a national sample of communities. The price estimates are adjusted based on the source of consumption and package size. We convert 2012 BTG price data into 2017 prices using the CPI for carbonated beverages (sodas and energy drinks) and non-carbonated beverages (fruit beverages and others). RTD tea and coffee prices are not available from the BTG sources; instead we calculate these prices based on the BMC 2015 wholesale dollar sales and gallonage, assuming a 100% mark-up for retail prices. We assume that inflation-adjusted beverage prices remain constant over time. Importantly, average beverage prices are constant across states and cities.

New Functionality

In estimating tax revenues, the calculator provides several options in setting important inputs to the model, including the tax pass through rate and the price elasticity of demand:

1. Tax pass through rate

    Our default and recommended setting for the tax pass through rate is 100%. In other words, we assume a full pass of the tax onto retail price for consumers, as would be expected based on economic theory. To consider alternative scenarios, it is possible for the calculator users to also estimate tax revenue assuming an incomplete tax pass through rate, specifically between 50% and 99%. We do not recommend using a lower pass through rate than 50% or over 100%. The same pass through is assumed for all types of beverages.

2. Price elasticity

    The default and recommended setting for the price elasticity of demand for sugary drinks is -1.21, based on the best current data as per literature review (Powell et al. 2013). If you want to explore the impact of other price elasticities in the range between -0.70 to -1.30, contact Healthy Food America for assistance. Based on the literature, we do not recommend using elasticity estimates outside of this range. The same price elasticity is assumed for all types of beverages.

Important Local Adjustments

Revenue projections for smaller local markets (e.g., cities) need to be considered in light of the assumptions and data used in developing this calculator as a generic model. Analysts working on local revenue estimates are encouraged to consider the following factors, which are outside the scope of this calculator but could be important in smaller markets:

1. There is **no** adjustment for tourism consumption. We use the residential population of states and cities and per capita sales to calculate total beverage sales.
2. We use national prices, which could be significantly lower or higher than local prices in certain markets.
3. It is important to consider the food environment of a smaller market and the location of food retailers, especially large stores, within the jurisdiction of the tax authority.

Table 1: BMC Regional Markets for Carbonated Soft Drinks and Fruit Drinks

NORTHEAST	SOUTH	EAST CENTRAL	WEST CENTRAL	WEST	SOUTHWEST	PACIFIC
Connecticut	Alabama	Illinois	Iowa	Colorado	Arizona	Alaska
Delaware	Arkansas	Indiana	Kansas	Idaho	New Mexico	California
D.C.	Florida	Kentucky	Minnesota	Montana	Oklahoma	Hawaii
Maine	Georgia	Michigan	Missouri	Nevada	Texas	Oregon
Maryland	Louisiana	Ohio	Nebraska	Utah		Washington
Massachusetts	Mississippi	West Virginia	North Dakota	Wyoming		
New Hampshire	North Carolina	Wisconsin	South Dakota			
New Jersey	South Carolina					
New York	Tennessee					
Pennsylvania	Virginia					
Rhode Island						
Vermont						

Source: Beverage Marketing Corporation (BMC).

Table 2: BMC Regional Markets for Sports Drinks, RTD Tea/Coffee, Energy Drinks

NORTHEAST	MIDWEST	SOUTH	WEST
Connecticut	Illinois	Alabama	Alaska
Delaware	Indiana	Arkansas	Arizona
D.C.	Iowa	Florida	California
Maine	Kansas	Georgia	Colorado
Maryland	Michigan	Kentucky	Hawaii
Massachusetts	Minnesota	Louisiana	Idaho
New Hampshire	Missouri	Mississippi	Montana
New Jersey	Nebraska	North Carolina	Nevada
New York	North Dakota	Oklahoma	New Mexico
Pennsylvania	Ohio	South Carolina	Oregon
Rhode Island	South Dakota	Tennessee	Utah
Vermont	Wisconsin	Texas	Washington
		Virginia	Wyoming
		West Virginia	

Source: Beverage Marketing Corporation (BMC).

References

U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates. Demographic and Housing Estimates of the Resident Population. Educational Attainment of the Resident Population.

U.S. Census Bureau, 2010 Census and July 1, 2015 Population Projections. U.S. Census Bureau, Population Division.

Proprietary data from the Beverage Marketing Corporation. New York, NY: Beverage Marketing Corporation of New York, 850 Third Avenue, New York, New York 10022.

Bureau of Labor Statistics; CPI - All urban consumers US city average, seasonally-adjusted estimates. Carbonated beverages and juices and non-carbonated beverages.

Powell LM, Chriqui JF, Khan T, Wada R, Chaloupka FJ. Assessing the potential effectiveness of food and beverage taxes and subsidies for improving public health: a systematic review of prices, demand and body weight outcomes. *Obes Rev*. 2013;14(2):110-128.

Powell LM, Isgor Z, Rimkus L, and Chaloupka FJ. Sugar-Sweetened Beverage Prices: Estimates from a National Sample of Food Outlets. Chicago, IL: Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago, 2014. www.bridgingthegapresearch.org