

# The Potential Economic Impact of a U.S. Excise Tax on Selected Beverages

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**Submitted to:**

American Beverage Association

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# The Potential Economic Impact of a U.S. Excise Tax on Selected Beverages

## Executive Summary

The United States Congress is considering the introduction of a national excise tax on sugar-sweetened beverages (an “SSB tax”). I have been asked by the American Beverage Association (ABA) to utilize existing beverage market analyses to estimate the potential economic effects that the proposed SSB tax would have on the consumption of both taxed and non-taxed beverages. I have also been asked to provide an estimate of the impact that an SSB tax could have on related industries and on the U.S. economy as a whole.

The analysis, described in detail below, suggests that an SSB tax comparable to that currently being discussed among policymakers would likely result in a significant short-term reduction in economic output in the industries currently involved in the production of beverages, and that negative short-term secondary effects could also be significant.<sup>1</sup>

The precise amount of the proposed SSB tax has not yet been determined. I have been asked by the ABA to examine two prospective alternative tax rates: 3 cents per 12 ounce serving (a proposal evaluated by the Congressional Budget Office<sup>2</sup>) and 10 cents per 12 ounce serving. Economic analyses of excise taxes often focus on what is referred to as a tax “pass-through” rate. A pass-through rate refers to the relationship between the amount of taxes collected by the government and the effect of the tax on prices paid by consumers. For the purpose of this analysis, I start with the assumption of a 100 percent pass-through rate. This assumption implies that a federal tax of 3 cents per 12 ounces on a particular beverage will result in an increase of 3 cents in the price consumers pay for a 12 ounce beverage.

Using a 100 percent pass-through rate, I estimate that a 3 cents tax per 12 ounces would result in an increase of 4 to 6 percent in the prices of the taxed beverages.<sup>3</sup> (See Table 1.) My demand analysis, which is based on an existing study by Dharmasena and Capps (2009),<sup>4</sup> suggests that total spending by U.S. consumers on beverages will fall by an estimated 6 percent. This reduction amounts to an estimated \$10 billion decrease in beverage industry revenues based on 2008 U.S. consumptions levels.

To estimate the “direct effect” that reductions in consumer spending on beverages have on jobs and wages, I conducted what is known as an input-output analysis. This input-output analysis suggests that the estimated reductions in beverage consumption associated with the 3 cents tax per 12 ounces will lead to a loss of approximately 60 thousand jobs in industries directly involved with the production and sale of beverages, and a corresponding reduction in wages of approximately \$2 billion. These industries include soft drink and ice manufacturing, wholesale trade businesses, and food and beverage retail trade stores.

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<sup>1</sup> Long-term adjustments in the U.S. economy to the short-term economic effects of the tax are not estimated in this study.

<sup>2</sup> “Budget Options Volume I: Health Care; Option 106,” Congressional Budget Office, December 2008.

<sup>3</sup> All numerical estimates discussed in the text and tables of this study have been rounded to the nearest whole number (for percentages), \$100 million (for dollar values) or 10,000 (for jobs) in order to reflect the fact that these estimates are not precise. The attached exhibits do not round off the numbers; however, the reader should interpret the numbers in the exhibits similar to those reported in the texts and the tables. Figures in the tables and text may not match those in the exhibits due to rounding.

<sup>4</sup> Senarath Dharmasena and Oral Capps Jr., “Demand Interrelationships of At-Home Nonalcoholic Beverage Consumption in the United States,” selected paper prepared for presentation at the Agricultural & Applied Economics Association’s 2009 AAEE & ACCI Joint Annual Meeting, Milwaukee, Wisconsin, July 26-29, 2009, downloaded from <http://purl.umn.edu/49443> (June 16, 2009).

I also utilized the input-output analysis to estimate the “secondary effects” associated with reductions in consumer spending on beverages. These secondary effects are in addition to the direct effects discussed above. Secondary effects include an “indirect effect” that captures the effect on industries that ultimately supply goods and services to the industries captured in the direct effects estimates. These indirectly effected industries include flavoring syrup and concentrate manufacturers, aluminum product manufacturers, and wholesale trade firms, among others. Many sectors of the economy account for some portion of the indirect effects due to the numerous interlocking relationships among the different economic sectors. The input-output analysis suggests that the estimated reductions in beverage consumption associated with the 3 cents tax per 12 ounces will lead to reduced economic output of an additional \$12 billion, a loss of approximately 50 thousand more jobs and a corresponding reduction in wages of an additional \$2 billion in sectors of the economy not directly involved in the production of beverages. This direct and indirect reduction in taxable economic activity would be accompanied by an estimated reduction of \$2 billion in federal, state and local tax revenues.<sup>5</sup>

Utilizing the same methodological approach described above, a 10 cent tax per 12 ounces would result in an estimated 13 to 21 percent increase in the price of taxed beverages and an estimated 19 percent reduction in consumer spending on beverages (after accounting for the effect on both taxed and non-taxed beverages and excluding payments associated with the tax.). This change results in an estimated loss of \$33 billion in revenues based on 2008 U.S. consumption levels. (See Table 1.) This reduction in beverage consumption (economic output) would lead to an estimated loss of approximately 210 thousand jobs in industries directly involved in the production of beverages and a corresponding \$8 billion reduction in wages. Estimates of indirect effects suggest that economic output could decline by an additional \$42 billion, with a corresponding loss of approximately 150 thousand jobs and \$8 billion in wages. This direct and indirect reduction in taxable economic activity would be accompanied by an estimated reduction of nearly \$8 billion in federal, state and local tax revenues.<sup>6</sup>

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<sup>5</sup> The change in tax revenues reflects change in economic activity as a result of direct and indirect effects only, and does not include incremental federal tax revenues generated by the proposed SSB tax. I address the net effect of changes in tax revenue below.

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**Table 1**  
**Estimated Direct Effect of SSB Tax on U.S. Economy**

Scenario	Change in Retail Price for Taxed Beverage Categories <sup>7</sup> (%)	Change in Retail Net Revenues <sup>8</sup> (%)	Predicted Direct Effect			
			Output <sup>9</sup> (\$billions)	Jobs (000s)	Wages (\$billions)	Taxes <sup>10</sup> (\$billions)
3 cent tax	4% to 6%	(6%)	(\$10.0)	(60)	(\$2.3)	(\$1.3)
10 cent tax	13% to 21%	(19%)	(\$33.3)	(210)	(\$7.8)	(\$4.2)

**Estimated Indirect Effect of SSB Tax on U.S. Economy**

Scenario	Change in Retail Price for Taxed Beverage Categories (%) <sup>11</sup>	Change in Retail Net Revenues <sup>12</sup> (%)	Predicted Indirect Effect			
			Output (\$billions)	Jobs (000s)	Wages (\$billions)	Taxes <sup>13</sup> (\$billions)
3 cent tax	4% to 6%	(6%)	(\$12.4)	(50)	(\$2.5)	(\$1.2)
10 cent tax	13% to 21%	(19%)	(\$41.5)	(150)	(\$8.2)	(\$4.0)

*Source: Exhibits 3, 7 and 10.*

The analysis described so far relies on the assumption that 100 percent of an SSB tax would be passed through to consumer retail prices. There is some evidence that an SSB tax may be passed through to consumers at a rate higher than 100 percent. A literature search revealed two studies that examined tax pass-through rate for non-alcoholic sugar-sweetened beverages (Besley and Rosen, 1999 and Bergman and Lynngard, 2009).<sup>14</sup> Both studies found evidence that consumer prices increased by more than twice the amount of the tax revenues associated with a tax on selected beverages. The Besley and Rosen study found that taxes on carbonated soft drinks were passed-through to consumers at a rate of 230 percent and the Bergman and Lynngard study found similar results. While both studies are subject to certain limitations, each suggests that an excise tax on beverages could be accompanied by a substantial markup on retail prices. Using the methodology described above, applying a 230 percent pass-through rate to a 3 cents tax per 12 ounces scenario results in an estimated 9 percent to 14 percent increase in the price of the taxed beverages.<sup>15</sup> A 10 cents tax per 12 ounces scenario would result in an increase in the prices of the taxed beverages of approximately 30 percent to 48 percent.<sup>16</sup> My analysis reveals that the large changes in prices resulting under high tax rates and high pass-through rates are likely to be accompanied by a

<sup>7</sup> Percentage change shown for taxed beverages only. Low end of range corresponds to change in price of isotonic and high end of the range corresponds to change in price of regular soft drinks. See Exhibit 3.

<sup>8</sup> Calculated as total after-tax retail sales (including pass-through of proposed excise tax) minus revenue generated by proposed SSB tax. Change shown net of decrease in taxed beverages and increase in non-taxed beverages.

<sup>9</sup> Measured as net change in beverage retail sales estimated in the demand analysis.

<sup>10</sup> Does not include tax revenue generated by proposed SSB tax.

<sup>11</sup> Percentage change shown for taxed beverages only. Low end of range corresponds to change in price of isotonic and high end of the range corresponds to change in price of regular soft drinks. See Exhibit 3.

<sup>12</sup> Calculated as total after-tax retail sales (including pass-through of proposed excise tax) minus revenue generated by proposed SSB tax. Change shown net of decrease in taxed beverages and increase in non-taxed beverages.

<sup>13</sup> Does not include tax revenue generated by proposed SSB tax.

<sup>14</sup> Timothy J. Besley and Harvey S. Rosen, "Sales Taxes and Prices: An Empirical Analysis," *National Tax Journal*, Vol. 52 No. 2 (June 1999), pp. 157-178. U. Michael Bergman and Niels Lynngard Hansen, "Excise Tax Pass-Through on Beverage Prices," Working Paper, March 17, 2009. The Besley and Rosen study used U.S. price data from 1982 through 1990. The Bergman and Hansen study used Danish price data from 1998, 2001 and 2003.

<sup>15</sup> See Exhibit 3.

<sup>16</sup> See Exhibit 3.

substantial reduction in industry economic output and employment, though a price increase of this level is too large to allow for meaningful estimates of the corresponding amounts.

The demand analysis underlying the above calculations is subject to a number of limitations, including the following:

- The Dharmasena and Capps study used in the demand analysis did not examine the same set of beverages that would be subject to the proposed SSB tax, nor did it examine the same set of potential substitute beverages. My analysis necessarily employed certain assumptions (discussed below) in order to apply the price elasticity estimates in the Dharmasena and Capps study to the analysis of beverages potentially affected by an SSB tax.
- The price elasticity estimates in the Dharmasena and Capps study are appropriately applied to small changes in beverage price. Consequently, the inferences made in the Dharmasena and Capps study regarding beverage substitution patterns may not hold for some of the larger SSB tax rates under consideration.
- The methodologies employed in this analysis rely on data that reflect historical relationships in consumer behavior and in the U.S. economy. Such historic relationships can change over time and may no longer hold. Moreover, the estimated relationships do not account for longer-term adjustments in consumer and producer behavior that would typically accompany significant changes in taxes and prices.
- As noted, I made the assumption that 100 percent of an SSB tax would be passed-through to consumers. This assumption may understate the actual pass-through rate. Further, the tax pass-through rate may vary from product to product. These possibilities are not incorporated into this study.
- Finally, there are other alternatives to consuming the beverages examined here, such as consuming tap water. Data limitations, however, preclude explicit consideration of all possible beverage alternatives. I do not estimate changes in consumption of non-beverage goods or changes in consumer saving in response to an SSB tax.

The input-output analysis I relied on also includes a number of limitations, including the following:

- The input-output analysis is subject to numerous simplifying assumptions and effectively relies on industry averages to estimate the relationship between changes in economic output and changes in various factors of production. The simplifying assumptions do not always hold in the actual economy.
- Estimates of secondary effects become less reliable for industries with more tenuous connections to those directly affected by the tax.
- Additionally, the input-output analysis does not rely on statistical “tests” that provide confidence intervals regarding the likely range of a given estimate. Accordingly, the reliability of the estimates is difficult to judge.
- Finally, the input-output analysis reflects estimated effects resulting from changes in consumer demand for beverages. It does not reflect effects resulting from other potential changes in consumer behavior such as consumption of non-beverage goods or changes in consumer saving.