

June 15, 2016

No. 216

Soda Taxes: a Failed Experiment that Needs to End

They Harm the Poor without Reducing Obesity

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Sin taxes have existed since at least the reign of Queen Cleopatra VII of Egypt, who legend has it enacted a tax on beer to reduce public drunkenness and raise money to war against Rome.¹ Also known as “lifestyle taxes,” sin taxes are placed on goods based on the notion that increasing the price will discourage individual behaviors perceived as unhealthy—like smoking—or dangerous when consumed irresponsibly—like drinking—and as having negative effects on society. At the same time, these taxes raise revenue to offset the supposed public costs of the supposedly harmful products being taxed, or to fund other government programs. Today, public health advocates champion taxing sugary foods and drinks, like soda, as a way to fight obesity.

While most U.S. states have food taxes that encompass products like soda, few—apart from Berkeley, California—have soda taxes specifically aimed at reducing obesity. Past efforts to implement these “fat taxes” have largely failed to gain support due to opposition from consumers, economists, and the industry,² but the recent apparent “success” in Mexico, which enacted a soda tax in 2014, has reinvigorated efforts in the states.³ Most recently, Philadelphia is considering a 1.5 to 3 cent per ounce soda tax aimed at raising \$400 million for a universal pre-K program and “other” programs.⁴ But do soda taxes work?

Arguments for soda taxes rely on the assumption that a small price increase will encourage people to consume less soda, and that reduced soda consumption will lead to an overall reduction in calorie consumption and thus weight. This paper examines these assumptions and makes the case that soda taxes disproportionately affect the poorest members of society while failing to achieve both their stated public health and revenue goals.

Do Soda Taxes Reduce Soda Consumption? Basic economic theory holds that as the price of a good increases, the demand for that good will decline, absent other variables. The main argument made by soda tax advocates is that increasing the price of sugary drinks will discourage their consumption. However, in the real world, individuals respond differently to price changes. For example, while some people may cut back on soda if it became more expensive, some might cut back on other groceries in order to dedicate more money toward soft drink purchases.

In economics, elasticity of demand is the amount that demand changes in response to a change in price or supply. Elasticity is not the same for every person nor the same for every product. Gasoline and milk, for example, are relatively *inelastic* because they are necessities

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in most households. Even if the prices increase significantly, most people will continue to buy gas and milk even if it means forgoing other purchases. The average price elasticity of demand for gas is estimated to be -0.26, meaning that a 10 percent increase in gas prices is expected to result in a 2.6 percent decline in sales within the first year—the lower the number the less elastic, or less reactive demand is to price.⁵ For soft drinks, the elasticity of demand is estimated to be around 0.79, so a 10 percent increase in the price of soda should result in reducing sales by 7.9 percent. But not everyone responds to price increases in the same way or the same over time.

Opponents of sin taxes often argue that they disproportionately affect lower income households—those with less money end up spending a greater portion of their income on the taxed items. Sin tax advocates hoping to reduce obesity might respond that these regressive taxes will be effective at nudging low-income families away from sugary high-calorie drinks. However, recent research into Mexico's 10 percent—or peso-per-liter—soda tax, shows this is likely not the case.

In a survey of 8,000 households done before and after implementation of the soda tax, researchers at the Mexico Autonomous Institute of Technology (ITAM) found that those in the lowest socioeconomic strata were least likely to reduce soda purchases in response to the price increase. This may be due to wealthier people having access to a greater variety of substitutes or those in lower socioeconomic levels seeing soda as a luxury item they are not willing to give up. Whatever the reason, the result is that those with the least amount of money are paying a greater proportion of the soda tax, which raised \$1.3 billion for the Mexican government in 2014.⁶

The most surprising finding from the ITAM study was that homes with an obese head of household were least affected by the change in soda prices, meaning that those individuals whose behavior the tax was designed to influence were the least likely to respond.⁷

Even if sin taxes manage to influence sales or consumption decisions, there is no guarantee the effect will remain constant over the long term. In Finland, for example, a 2011 tax on confectionery items reduced sales of sweets at first, but within a year media and shops reported that sales had returned to pre-tax levels.⁸ Similarly, the Mexican soda tax correlated with a decline in sales volume of 1.9 percent, but rebounded the following year—increasing by 0.5 percent in 2015 over the previous year's sales.⁹

In a 2012 Cornell field study looking at an American city of 62,000 residents, researchers found that when half the population were required to pay a 10 percent tax on calorie-dense foods, like soda, consumption of soft drinks did initially decrease, but was similar to the non-taxed group by the end of the six-month experiment. Notably, the researchers found that in the taxed group, sales of beer were higher than they were before the tax—potentially raising other kinds of public health issues.¹⁰

For tax advocates, even these small dips in sales of sugary drinks and candy are seen as move in the right direction because they assume even modest declines in purchasing translates to a reduction in total calorie consumption (though those hoping to raise revenue

from such taxes might not be so pleased). But simply because people are buying less soda does not mean they are eating fewer calories overall.

Do Soda Taxes Reduce Obesity? It doesn't take a PhD to understand that consuming several hundred more calories a day than you burn off leads to weight gain. However, simply reducing the sales volume of soda does not mean people will reduce their overall calorie balance. While increasing the price of a good can reduce its demand, the price of a single good or single category of goods is not enough to predict how people will respond across a wide array of products. For example, a soda tax may nudge some people away from purchasing soda, but if they consume an equal number of calories from fruit juice, milk, or beer, the elimination of soda from their diet will have no effect on weight.

In the U.S., researchers estimate that calories from sugary drinks comprise just 7 percent of total calorie intake. In a 2010 study, Jason L. Fletcher of Yale, David Frisvold of Emory, and Nathan Tefft of Bates College warn that “we should expect only modest changes in population weight through soft drink consumption responses to small tax increases.”¹¹ In Mexico, where soda consumption is among the highest in the world, researchers found that the soda tax, which increased overall cost of calories by 4 percent, only reduced calorie consumption by 1 percent per week.¹² When they examined BMI before and after implementation of the tax, they found “no discernable difference.”¹³

Soda tax advocates likely will argue that the problem is that the taxes are too low. Yet, researchers who looked at the effects of soda taxes of up to 40 percent found only the smallest amount of weight change after a year. They found that people in the study rarely switched from full-sugar soda to either diet soda or water, and instead substituted sodas with equally high-calorie products.¹⁴

A 2016 joint study by the World Health Organization and the University of North Carolina at Chapel Hill found that early studies of the Mexican soda tax, which boasted a reduction in sales, did not account for beverages not sold in stores—like *aguas frescas*, a popular beverage of fruits, seeds, flowers, cereal, sugar, and water made at home or sold by street vendors.¹⁵ It is very possible that those households that reduced soda purchasing as a result of the tax substituted with homemade drinks like this.

Assuming that the initial estimates of a 12 percent decline in soda sales in Mexico were accurate, even that amount would not result in a significant enough decrease in calories to affect the weight of a large number of people. According to a study conducted by the Beverage Marketing Corporation, a consulting firm for the beverage industry, the initial drop resulted in an average decrease of six to seven calories a day.¹⁶ Moreover, a 2013 study published in the *American Journal of Agricultural Economics* found that while a half cent per ounce soda tax did decrease consumption, it increased consumption of sodium and fat as a result of product substitution.¹⁷

Conclusion. Sin taxes are a blunt instrument that have unpredictable effects on consumer behavior, as well as unintended consequences. The poorest in our communities often bear the financial brunt of these regressive taxes, which are ineffective at combating obesity.

Despite the best intentions of public health advocates pushing for a soda tax, the real-world effects of sin taxes on foods have been universally lackluster. Experience shows they disadvantage those least able to absorb the cost, without measurably improving public health. It is time to discontinue this failed experiment.

Notes

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³ Sarah Boseley, "Mexico Enacts Soda Tax in Effort to Combat World's Highest Obesity Rate," *The Guardian*, January 16, 2014, <http://www.theguardian.com/world/2014/jan/16/mexico-soda-tax-sugar-obesity-health>.

⁴ Martha C. White, "Philadelphia Tries for a More Palatable Soda-Tax," NBC News, May 23, 2016, <http://www.nbcnews.com/business/consumer/philly-tries-more-palatable-soda-tax-pitch-n578806>.

⁵ Molly Espey, "Explaining the variation in elasticity estimates of gasoline demand in the United States: A meta-analysis," *Energy Economics*, Vol. 20 (1998), http://courses.washington.edu/pbafadv/examples/Espey_Gasoline_Demand_Meta-Analysis.pdf.

⁶ Arturo Aguilar, Emilio Gutierrez, Enrique Seira, "Taxing Calories in Mexico," Mexico Autonomous Institute of Technology, December 2015, <http://cie.itam.mx/sites/default/files/cie/15-04.pdf>. At the time of this paper's publication, the ITAM study had not yet been accepted by a peer-reviewed journal.

⁷ Ibid.

⁸ Laura Cornelsen, Rosemary Green, Alan Dangour, and Richard Smith, "Why Fat Taxes Won't Make us Thin," *Journal of Public Health*, pp. 1-6, May 2014, [jpubhealth.oxfordjournals.org/content/early/2014/05/21/pubmed.fdu032.full#ref-11](http://pubhealth.oxfordjournals.org/content/early/2014/05/21/pubmed.fdu032.full#ref-11).

⁹ Amy Guthrie, "Soda Sales in Mexico Rise despite Tax," *Wall Street Journal*, May 3, 2016, <http://www.wsj.com/articles/soda-sales-in-mexico-rise-despite-tax-1462267808>.

¹⁰ Brian Wansink, Andrew S. Hanks, and David R. Just, "From Coke to Coors: A Field Study of a Fat Tax and its Unintended Consequences," Cornell University, 2012, <http://conscienhealth.org/wp-content/uploads/2014/05/ssrn-id2079840.pdf>.

¹¹ Jason M. Fletcher, David Frissvold, and Nathan Tefft, "Can Soft Drink Taxes Reduce Population Weight," *Contemporary Economic Policy*, Vol. 28, No. 1 (January 2010), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2908024/>.

¹² Aguilar et al.

¹³ Ibid.

¹⁴ Alice Park, "Study: Soda Taxes May Not Be Enough to Curb Obesity," *Time*, December 13, 2010, <http://healthland.time.com/2010/12/13/study-sugar-tax-may-lead-to-only-modest-weight-loss/>.

¹⁵ M. Arantxa Colchero, Barry M Popkin, Juan A Rivera, and Shu Wen Ng, "Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study," *British Medical Journal*, January 2016, <http://www.bmj.com/content/352/bmj.h6704>.

¹⁶ Guthrie.

¹⁷ Chen Zhen, et al "Predicting the effects of sugar-sweetened beverage taxes on food and beverage demand in large demand systems," *American Journal of Agricultural Economics*, July 29, 2013, <http://ajae.oxfordjournals.org/content/early/2013/07/28/ajae.aat049.abstract>.