A Soda Tax Would Help Reduce Obesity

Kelly D. Brownell et al.

In the following viewpoint, Kelly D. Brownell and several colleagues argue that the consumption of sodas and other sugar-sweetened beverages may lead directly or indirectly to weight gain and other health problems. Because of the adverse effects associated with drinking these beverages, Brownell and his colleagues believe the government should impose an excise tax on caloric sweeteners that will raise the retail price of sugar-sweetened drinks. The authors contend that this tax will dissuade many people from drinking these beverages in excess and convince them to drink water or other healthier options. Kelly D. Brownell is a professor of psychology at Yale University. The coauthors of this viewpoint come from other academic institutions and various state health organizations.

Consumption of Sugar-Sweetened Beverages Is Linked to Obesity

In recent decades, intake of sugar-sweetened beverages has increased around the globe; for example, intake in Mexico doubled between 1999 and 2006 across all age groups. Between 1977 and 2002, the per capita intake of caloric beverages doubled in the United States across all age groups. The most recent data (2005–2006) show that children and adults in the United States consume about 172 and 175 kcal [kilocalorie] daily, respectively, per capita from sugar-sweetened beverages.

The relationship between the consumption of sugar-sweetened beverages and body weight has been examined in many cross-sectional and longitudinal studies and has been summarized in systematic reviews. A meta-analysis showed positive associations between the intake of sugar-sweetened beverages and body weight—associations that were stronger in longitudinal studies than in cross-sectional studies and in studies that were not funded by the beverage industry than in those that were. A meta-analysis of studies involving children—a meta-analysis that was supported by the beverage industry—was interpreted as showing that there was no evidence of an association between consumption of sugar-sweetened beverages and body weight, but it erroneously gave large weight to several small negative studies; when a more realistic weighting was used, the meta-analysis summary supported a positive association. A prospective study involving middle school students over the course of 2 academic years showed that the risk of becoming obese increased by 60% for every additional serving of sugar-sweetened beverages per day.

In an 8-year prospective study involving women, those who increased their consumption of sugar-sweetened beverages at year 4 and maintained this increase gained 8 kg [kilograms], whereas those who decreased their intake of sugar-sweetened beverages at year 4 and maintained this decrease gained only 2.8 kg.

Short-term clinical trials provide an experimental basis for understanding the way in which sugar-sweetened beverages may affect adiposity [obesity]. [In a 1990 study published in the American Journal of Clinical Nutrition, M.G.] Tordoff and [A.M.] Alleva found that as compared with total energy intake and weight during a 3-week period in which no beverages were provided, total energy intake and body weight increased when subjects were given 530 kcal of sugar-sweetened beverages per day for 3 weeks but decreased when subjects were given noncaloric sweetened beverages for the same length of
time. [In a 2002 study published in the American Journal of Clinical Nutrition, A.] Raben et al. reported that obese subjects gained weight when they were given sucrose, primarily in the form of sugar-sweetened beverages, for 10 weeks, whereas they lost weight when they were given noncaloric sweeteners for the same length of time.

Four long-term, randomized, controlled trials examining the relationship between the consumption of sugar-sweetened beverages and body weight have been reported; the results showed the strongest effects among overweight persons.

**Diabetes and Heart Disease**

Three prospective, observational studies—one involving nurses in the United States, one involving Finnish men and women, and one involving black women—each showed positive associations between the consumption of sugar-sweetened beverages and the risk of type 2 diabetes. Among the 91,249 women in the Nurses’ Health Study II who were followed for 8 years, the risk of diabetes among women who consumed one or more servings of sugar-sweetened beverages per day was nearly double the risk among women who consumed less than one serving of sugar-sweetened beverages per month; about half the excess risk was accounted for by greater body weight. Among black women, excess weight accounted for most of the excess risk.

Among 88,520 women in the Nurses’ Health Study, the risk of coronary heart disease among women who consumed one serving of sugar-sweetened beverages per day, as compared with women who consumed less than one serving per month, was increased by 23%, and among those who consumed two servings or more per day, the risk was increased by 35%. Increased body weight explained some, but not all, of this association.

**How Soda Drinking Contributes to Poor Health**

A variety of behavioral and biologic mechanisms may be responsible for the associations between the consumption of sugar-sweetened beverages and adverse health outcomes, with some links (e.g., the link between intake of sugar-sweetened beverages and weight gain) better established than others. The well-documented adverse physiological and metabolic consequences of a high intake of refined carbohydrates such as sugar include the elevation of triglyceride levels and of blood pressure and the lowering of high-density lipoprotein cholesterol levels, which would be expected to increase the risk of coronary heart disease. Because of the high glycemic load of sugar-sweetened beverages, consumption of these beverages would be expected to increase the risk of diabetes by causing insulin resistance and also through direct effects on pancreatic islet cells. Observational research has shown that consumption of sugar-sweetened beverages, but not of noncalorically sweetened beverages, is associated with markers of insulin resistance.

Intake of sugar-sweetened beverages may cause excessive weight gain owing in part to the apparently poor satiating properties of sugar in liquid form. Indeed, adjustment of caloric intake at subsequent meals for energy that had been consumed as a beverage is less complete than adjustment of intake for energy that had been consumed as a solid food. For example, in a study involving 323 adults, in which 7-day food diaries were used, energy from beverages added to total energy intake instead of displacing other sources of calories. The results of a study of school-age children were consistent with the data from adults and showed that children who drank 9 oz or more of sugar-sweetened beverages per day consumed nearly 200 kcal per day more than those who did not drink sugar-sweetened beverages.
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Short-term studies of the effect of beverage consumption on energy intake support this mechanism. Among 33 adults who were given identical test lunches on six occasions but were given beverages of different types (sugar-sweetened cola, noncaloric cola, or water) and amounts (12 oz [355 ml] or 18 oz [532 ml]), the intake of solid food did not differ across conditions; the result was that there was significantly greater total energy consumption when the sugar-sweetened beverages were served.

Sugar-sweetened beverages may also affect body weight through other behavioral mechanisms. Whereas the intake of solid food is characteristically coupled to hunger, people may consume sugar-sweetened beverages in the absence of hunger, to satisfy thirst or for social reasons. Sugar-sweetened beverages may also have chronic adverse effects on taste preferences and food acceptance. Persons—especially children—who habitually consume sugar-sweetened beverages rather than water may find more satiating but less sweet foods (e.g., vegetables, legumes, and fruits) unappealing or unpalatable, with the result that their diet may be of poor quality.

Economic Reasons to Intervene
Economists agree that government intervention in a market is warranted when there are “market failures” that result in less-than-optimal production and consumption. Several market failures exist with respect to sugar-sweetened beverages. First, because many persons do not fully appreciate the links between consumption of these beverages and health consequences, they make consumption decisions with imperfect information. These decisions are likely to be further distorted by the extensive marketing campaigns that advertise the benefits of consumption. A second failure results from time-inconsistent preferences (i.e., decisions that provide short-term gratification but long-term harm). This problem is exacerbated in the case of children and adolescents, who place a higher value on present satisfaction while more heavily discounting future consequences. Finally, financial “externalities” exist in the market for sugar-sweetened beverages in that consumers do not bear the full costs of their consumption decisions. Because of the contribution of the consumption of sugar-sweetened beverages to obesity, as well as the health consequences that are independent of weight, the consumption of sugar-sweetened beverages generates excess health care costs. Medical costs for overweight and obesity alone are estimated to be $147 billion—or 9.1% of U.S. health care expenditures—with half these costs paid for publicly through the Medicare and Medicaid programs.

Selecting an Appropriate Tax and Tax Rate
Key factors to consider in developing an effective policy include the definition of taxable beverages, the type of tax (sales tax or excise tax), and the tax rate. We propose an excise tax of 1 cent per ounce for beverages that have any added caloric sweetener. An alternative would be to tax beverages that exceed a threshold of grams of added caloric sweetener or of kilocalories per ounce. If this approach were used, we would recommend that the threshold be set at 1 g [gram] of sugar per ounce (30 ml) (32 kcal per 8 oz [237 ml]). Another option would be a tax assessed per gram of added sugar, but such an approach would be difficult to administer. The advantage of taxing beverages that have any added sugar is that this kind of tax is simpler to administer and it may promote the consumption of no-calorie beverages, most notably water; however, a threshold approach would also promote caloric reductions and would encourage manufacturers to reformulate products. A consumer who drinks a conventional soft drink (20 oz [591 ml]) every day and switches to a beverage below this threshold would consume approximately 174 fewer calories each day.
A specific excise tax (a tax levied on units such as volume or weight) per ounce or per gram of added sugar would be preferable to a sales tax or an ad valorem excise tax (a tax levied as a percentage of price) and would provide an incentive to reduce the amount of sugar per ounce of a sugar-sweetened beverage. Sales taxes added as a percentage of retail cost would have three disadvantages: they could simply encourage the purchase of lower-priced brands (thus resulting in no calorie reduction) or of large containers that cost less per ounce; consumers would become aware of the added tax only after making the decision to purchase the beverage; and the syrups that are used in fountain drinks, which are often served with multiple refills, would remain untaxed. A number of states currently exempt sugar-sweetened beverages from sales taxes along with food, presumably because food is a necessity. This practice should be eliminated, whether or not an excise tax is enacted.

Excise taxes could be levied on producers and wholesalers, and the cost would almost certainly be passed along to retailers, who would then incorporate it into the retail price; thus, consumers would become aware of the cost at the point of making a purchase decision. Taxes levied on producers and wholesalers would be much easier to collect and enforce than taxes levied on retailers because of the smaller number of businesses that would have to comply with the tax; in addition, the sugar used in syrups could be taxed—a major advantage because of the heavy sales of fountain drinks. Experience with tobacco and alcohol taxes suggests that specific excise taxes have a greater effect on consumption than do ad valorem excise taxes and can also generate more stable revenues because they are less dependent on industry pricing strategies. In addition, tax laws should be written with provisions for the regular adjustment of specific excise taxes to keep pace with inflation, in order to prevent the effect of the taxes on both prices and revenues from eroding over time.

Expected Reduction in Consumption

A tax of 1 cent per ounce of beverage would increase the cost of a 20-oz soft drink by 15 to 20%. The effect on consumption can be estimated through research on price elasticity (i.e., consumption shifts produced by price). The price elasticity for all soft drinks is in the range of −0.8 to −1.0. (Elasticity of −0.8 suggests that for every 10% increase in price, there would be a decrease in consumption of 8%, whereas elasticity of −1.0 suggests that for every 10% increase in price, there would be a decrease in consumption of 10%.) Even greater price effects are expected from taxing only sugar-sweetened beverages, since some consumers will switch to diet beverages. With the use of a conservative estimate that consumers would substitute calories in other forms for 25% of the reduced calorie consumption, an excise tax of 1 cent per ounce would lead to a minimum reduction of .10% in calorie consumption from sweetened beverages, or 20 kcal per person per day; a reduction that is sufficient for weight loss and reduction in risk (unpublished data). The benefit would be larger among consumers who consume higher volumes, since these consumers are more likely to be overweight and appear to be more responsive to prices. Higher taxes would have greater benefits.

A controversial issue is whether to tax beverages that are sweetened with noncaloric sweeteners. No adverse health effects of noncaloric sweeteners have been consistently demonstrated, but there are concerns that diet beverages may increase caloric consumption by justifying consumption of other caloric foods or by promoting a preference for sweet tastes. At present, we do not propose taxing beverages with noncaloric sweeteners, but we recommend close tracking of studies to determine whether taxing might be justified in the future.

Potential Benefits and Concerns

The revenue generated from a tax on sugar-sweetened beverages would be considerable and could be used to help support
Nutrition

What Should Be Done to Improve Nutrition and Fight Obesity?

childhood nutrition programs, obesity-prevention programs, or health care for the uninsured or to help meet general revenue needs. A national tax of 1 cent per ounce on sugar-sweetened beverages would raise $14.9 billion in the first year alone. Taxes at the state level would also generate considerable revenue—for example, $139 million in Arkansas, $183 million in Oregon, $221 million in Alabama, $928 million in Florida, $937 million in New York, $1.2 billion in Texas, and $1.8 billion in California. A tax calculator that is available online can generate revenue numbers for states and 25 major cities.

One objection to a tax on sugar-sweetened beverages is that it would be regressive [that is, it would take a larger percentage of income from poor people]. This argument arose with respect to tobacco taxes but was challenged successfully by proponents of the taxes, who pointed out that the poor face a disproportionate burden of smoking-related illnesses, that nearly all smokers begin to smoke when they are teenagers, and that both groups are sensitive to price changes. In addition, some of the tobacco revenue has been used for programs developed specifically for the poor and for youth. The poor are most affected by illnesses that are related to unhealthy diets, and brand loyalties for beverages tend to be set by the teenage years. In addition, sugar-sweetened beverages are not necessary for survival, and an alternative (i.e., water) is available at little or no cost; hence, a tax that shifted intake from sugar-sweetened beverages to water would benefit the poor both by improving health and by lowering expenditures on beverages. Designating revenues for programs promoting childhood nutrition, obesity prevention, or health care for the uninsured would preferentially help those most in need.

A second objection is that taxing sugar-sweetened beverages will not solve the obesity crisis and is a blunt instrument that affects even those who consume small amounts of such beverages. Seat-belt legislation and tobacco taxation do not eliminate traffic accidents and heart disease but are neverthe-
A Soda Tax Would Not Help Reduce Obesity

Michael L. Marlow and Alden F. Shiers

Michael L. Marlow and Alden F. Shiers are professors of economics at California Polytechnic State University. In the viewpoint that follows, Marlow and Shiers claim that a tax on sodas and other sugar-sweetened beverages is not the remedy to fight obesity. The pair concludes that the link between soda consumption and weight gain is not proven, and even if it were proven, Marlow and Shiers assert that a tax would be difficult to apply as well as unfair to those soda drinkers who do not suffer from obesity. Finally, Marlow and Shiers argue that a soda tax will likely push drinkers to find substitutes for sugar-sweetened beverages and thus not cure the problem.

As you read, consider the following questions:

1. What percentage of US soda sales is made up of regular (sugar-sweetened) soda, as Marlow and Shiers report?

2. In a paper published in *Contemporary Economic Policy* and cited by the authors, by what fraction do Jason Fletcher and colleagues believe a 58 percent tax on sodas would drop the average body mass index?

3. Why do Marlow and Shiers doubt that a soda tax would be used to fund obesity prevention programs?

Roughly one-third of U.S. adults are classified as obese, which is defined as having a body mass index of 30 or higher. Obesity is especially prevalent among minorit African-Americans have a 51 percent higher prevalence of obesity, and Hispanics have 21 percent higher obesity prevalence than whites.

Obesity has become a major public health concern, given its association with chronic conditions that include diabetes, hypertension, high cholesterol, stroke, heart disease, cancer, and arthritis. Excess mortality stemming primarily from cardiovascular disease and diabetes is also believed to be associated with higher grades of obesity. Researchers at the Centers for Disease Control and Prevention in Atlanta estimated that obesity now accounts for 9.1 percent of all medical spending—$147 billion in 2008.

Various factors are believed to promote rising obesity rates but the hypothesized relationship between “nutritionally sweetened beverages” (NSBs) and obesity has increasingly become the focus of attention. Some public health advocates call Pigouvian taxes after economist Arthur Pigou) on these beverages, often referred to as “soda taxes,” as effective interventions that will lower obesity as well as generate tax revenue that can be used to fund public programs aimed at lower obesity.

In this viewpoint, we discuss the economic theory of empirical evidence of using soda taxes to lower obesity. We conclude that these taxes are unlikely to significantly lower obesity, and that they promote many unintended consequences.
that may adversely affect public health. Higher tax revenues stemming from soda taxes are also likely to be used to expand government programs other than those associated with controlling obesity, much as cigarette tax revenue now does.

Questionable Assumptions Concerning a Soda Tax

Proponents of soda taxes argue for government intervention because, they say, free markets fail to allocate resources in soda markets efficiently, with the ultimate consequence being too many obese people. Three assumptions underlie their argument:

- Soda causes obesity.
- Consumers lack adequate information and beverage choices.
- Soda drinkers impose external costs on others who pick up some portion of obese people’s higher medical costs.

Let us consider each of these assumptions.

The correlation between soda consumption and obesity rates does not imply that soda consumption causes obesity. Other possibilities include obesity causes soda consumption, no relationship exists between soda consumption and obesity, and soda consumption and obesity are interdependent. Moreover, even if soda consumption did cause obesity, there is no reason to believe that soda is the lone causal factor behind obesity; other likely candidates include lack of exercise, age, genetics, consumption of other high-calorie foods and beverages, and many other factors.

Tax advocates claim that soda consumption causes obesity, but evidence demonstrating this causal link is weak at best. A 2006 [American Journal of Clinical Nutrition] review article by Vasanti Malik et al. of the relationship between the consumption of sugar-sweetened beverages and obesity found 16 studies indicating a significant positive relationship between consumption and body mass index, 10 studies that did not find significant positive relationship, and four studies with mixed results. A 2007 [American Journal of Public Health] literature review by Lenny Vartanian et al. found eight studies with significant positive relationship, 15 studies with no significant positive relationship, and two studies with mixed results.

Although the authors of these surveys conclude that evidence supports the view that soda consumption causes obesity, we suggest the evidence remains less than clear. A number of factors in their surveys demonstrate correlation and not causation, and ignore confounding factors such as age, exercise, genetics, and other factors that probably affect body weight.

The Malik survey acknowledges this point:

Overall, results from our review support a link between the consumption of sugar-sweetened beverages and the risks of overweight and obesity. However, interpretation of the published studies is complicated by several method-related issues, including small sample size, short duration of follow-up, lack of repeated measures of dietary exposures and outcomes, and confounding by other diet and lifestyle factors.

A recent commentary by David Allison and Richard M. in JAMA: The Journal of the American Medical Association acknowledges this same point:

Given current evidence, little can be concluded with confidence beyond the fact that requiring individuals to drink large amounts of NSBs causes greater weight gain than no doing so. Randomized controlled trials of NSB consumption reduction have been applied effectiveness studies rather than rigorously controlled efficacy studies. Only the latter insure fidelity of the intervention.
The authors conclude that much of the research and subsequent news reports surrounding the issue have been extensively influenced by multiple biases that have eroded the reporting of objective science on this important public health matter.

**The Role of Consumer Choice**

Some soda tax advocates claim that consumers drink too much soda as a result of inadequate access to healthier food and beverage choices. But there are roughly 40,000 food products in the typical U.S. supermarket. It is difficult to argue that this array of products somehow ignores consumer preferences, especially given competitive pressures and technological advances in processing, storage, transportation, and communication.

The growing variety of food products reflects an industry that adapts to consumer preferences regarding health-related choices. Between 1987 and 2004, 35,272 new food products labeled “low fat” or “no fat” were introduced into the U.S. food market. That led researchers at the U.S. Department of Agriculture to conclude that unhealthy food consumption patterns do not stem from a market failure to supply healthy food and beverage choices.

While regular soda accounts for roughly 70 percent of U.S. soda sales, diet soda sales have been growing rapidly. Some forecasters predict that diet sales will eventually overtake regular soda. It thus seems that an active private market exists in providing “healthy” choices to consumers, which suggest that there is little need for government intervention into soda markets.

**Figuring the Costs of Obesity**

Soda tax advocates argue that negative externalities—external costs not fully accounted for in markets—indicate a market failure in which too much soda is consumed. Externalities are argued to exist because consumers who become obese will not fully pick up the higher medical costs associated with their obesity. Taxes equal to these external costs would theoretically raise soda prices to levels consistent with efficient consumption levels.

However, it is unlikely that taxes could ever correct for any externality associated with obesity. The problem with the externality argument is that, even if obesity raises health care costs of the obese, this externality should be corrected by having health insurers impose surcharges on obese insureds that reflect the additional costs. Few criticize surcharges imposed by auto insurance firms on drivers with drunk driving records, so why not correct for higher costs associated with obesity through insurance premiums?

Unfortunately, federal health care legislation passed earlier this year [2010] severely reduces or eliminates differential health insurance pricing. The legislation requires insurance companies to provide coverage for preventive health services, which include obesity screening and nutritional counseling. The legislation does not require obese people to pay more for insurance, but provisions could possibly allow insurers to charge premiums to people with “lifestyle risk factors” such as tobacco use. It remains doubtful that obesity will be considered a lifestyle risk, however, given the legislation’s focus on obesity screening and nutritional counseling. Moreover, expected eliminations of preexisting exclusion clauses that previously allowed insurers to deny coverage to obese individuals and those with past bariatric surgery would reinforce the view that obesity is not a lifestyle risk factor that should be reflected in higher insurance premiums.

Still, it remains unclear that soda consumption causes obesity, or that it is the sole causal factor behind obesity. And even if it is, the sensible policy would be to alter health insurance premiums to allow for obesity risk premiums, not a Pi-
people are interested in controlling. Yet we are not aware of an soda tax advocate who also supports adjusting health insur ance premiums.

Finally, even if obesity shortens lives, economic theory indi cates that obesity reflects a positive externality rather than negative one. That is, external benefits associated with obese are not fully accounted for in markets since obese individu collect less from Medicare and Social Security over the shorter lifetimes. Kip Viscusi has estimated that smokers "save taxpayers roughly 234-324" for each pack of cigarettes the smoke because of reduced social insurance costs—in additio to excise taxes already levied on cigarettes. A recent paper by K. McPherson, analyzing United Kingdom data found that, a though annual health care costs are highest for obese peop earlier in life (until age 56 years), and are higher for smoke at older ages, the ultimate lifetime costs are highest for the healthy (nonsmoking, non-obese) people. McPherson finds that life expectancy from age 20 is reduced by five years for obese people and seven for smokers. The consequence is th healthy people live to incur greater medical expenditure a average, more than compensating for the earlier excess cos related to obesity or smoking.

Non-obese individuals thus receive external benefits in a form of additional public resources. If we were to follow so tax advocates' thinking, then we should in fact subsidize so consumption so as to encourage it. Despite tax advocates' fondness for taxing negative externalities, they never seem anxious to correct positive externalities.

What Is the "Correct" Soda Tax?

Even if tax advocates are correct about soda consumpti causing so many problems, it is unlikely that soda taxes wou rectify the externality. The distance between theory and pra tice in the real world is great enough to warrant much skep cism over the ability of policy makers to calculate the "cc
rect” tax and then implement it in a world where politics and special interests have vested interests in designing tax codes.

Policy makers must legislate “correct” taxes to truly correct externalities. Since it remains unclear that soda consumption causes obesity or whether it reflects negative or positive externalities, the possible range of “correct” soda taxes lies between positive, zero, and negative values. Thus, it is unclear if obesity should be taxed, subsidized, or simply left alone, although tax advocates assume it should be taxed. Even if they are correct, the probability that policy makers know the correct tax is slim to none, thus leading to further possibilities that the tax is set too high, causing further erosion of resource efficiency.

Economic theory also indicates that, if there are negative externalities, taxes should vary over different beverages as well as different groups of consumers. Studies imply that the effects of NSBs on obesity differ for different types of drinks and, because different racial/ethnic groups have different preferences, that taxes should vary between groups. As noted above, the prevalence of obesity is highest for non-Hispanic blacks, followed by Hispanics, and then non-Hispanic whites. In addition, consumption data reveal that white persons consume more carbonated soft drinks than other racial/ethnic groups, and that blacks consume more high-caloric fruit drinks and ades [lemonade, limeade, orangeade, etc.]. If NSBs are a major cause of obesity, then these data suggest that fruit drinks and ades are a greater cause of obesity than carbonated soft drinks, and therefore fruit drinks and ades should be subjected to a higher tax than carbonated soft drinks. Yet there are no estimates of how much greater are the externalities of fruit drinks and ades than carbonated soft drinks, so there is no basis for determining the correct taxes. It is also unlikely that differential taxation across racial/ethnic groups would be legislated, thus again calling into question the ability of policy makers to “correctly” tax beverages for various externalities.

Unfairly Applied and Insignificant in Reducing Obesity

Although common sense indicates that not all soda drinkers are obese or even overweight, a soda tax cannot differentiate between consumers by their weight. Even if soda consumption causes obesity, there is no logic to taxing consumers—ever excessive ones—who do not have weight problems.

Moreover, taxes on all soda consumers are likely to exert differential effects on light vs. heavy demanders. A recent study finds that taxes on alcohol consumption significantly lower drinking by light drinkers, but not heavy drinkers. Thus taxes dramatically lower consumption of those who drink relatively little, but exert little to no effect on consumer habits of those individuals who are the targets of policy makers. There is little reason to suspect anything different in the case of soda taxes.

Soda tax hikes are also unlikely to be large enough to significantly lower the weight of the population. A recent [2016 Contemporary Economic Policy] paper by Jason Fletcher et al examined how state tax rate changes from 1990 to 2006 affected body mass index. They found that a one percentage point increase in the tax rate was associated with a decrease of just 0.003 points in body mass. Thus, even a large tax increase is unlikely to exert much effect on population weight. The authors concluded, for example, that a 58 percent tax on soda equivalent to the average federal and state tax on cigarettes would drop the average body mass by only 0.16 points—a trivial effect given that obesity is defined as a body mass index of at least 30. Thus, it is most unlikely that taxes could be raised enough to transform the obese into much slimmer people.

Consumers Will Find Substitutes

Unintended consequences of government intervention arise whether or not its advocates wish to acknowledge them. Eco
nomic theory demonstrates that taxes focused on one product, such as soda, will lead consumers to purchase substitutes. What beverages and food consumers would switch to and what the social effects of that change would be are not known.

Soda tax advocates seem to believe that a soda tax will lead to more water and diet drink consumption, but it is likely that substitutions into other products with caloric properties similar to soda will arise, with overall effects on weight unknown. Moreover, a supply of new drink choices is likely to emerge that creatively circumvents the new taxes, thus again muting intended reductions in sugar consumption.

Examples of unintended consequences of interventions abound. A 2004 [Journal of Health Economics] study by M.C. Farrelly et al. and a 2006 [American Economic Review] study by J. Adda and F. Cornaglia both indicate that tax hikes on cigarettes have led smokers to switch to higher tar and nicotine brands so that they can maintain chemical intake levels as they smoke less, to the detriment of their health. A 2001 [Journal of Health Economics] study by John DiNardo and Thomas Lemieux found that teen marijuana consumption rose following state tax increases on beer. A 2004 [Journal of Health Economics] study by S.Y. Chou et al. found that higher cigarette prices, which reduce smoking, are associated with higher rates of obesity.

Recent research suggests a few of the unintended consequences of soda taxes. Some consumers will likely switch to diet sodas, but some researchers worry that the health effects of artificial sweeteners may be worse than those of regular sugar. A recent [2009 Journal of Public Economics] study by Gideon Yaniv et al. concludes that a tax on junk food (including soda) could increase obesity as it leaves less time for exercise, especially among physically active people, when it leads them to spend more time shopping for fresh ingredients and preparing food at home.

A Soda Tax Cannot Remedy All Obesity Factors

Recent economic research indicates that factors other than soda are probable causal factors of obesity. A 2003 [Perspectives in Biology and Medicine] study by Tomas Philipson and Richard Posner finds that technological change has reduced the demands for heavy labor and thus created a more sedentary workforce prone to weight gain. Another 2003 [Journal of Economic Perspectives] study by David Cutler et al. points out that improvements in food-storage technology have reduced the time cost of preparing meals, which leads to more fast and beverage consumption. Finally, huge innovations in medical technology that include treatment of obesity-related illnesses have arisen that lessen health-related costs of obesity. As a result, some people have become less concerned about their weight. It remains unclear how a soda tax would or turn any of these factors that contribute to weight gain.

Failure of Good Intentions

Despite good intentions or political promises to the contrary, past efforts to fund prevention programs often fund very little of those programs. Tobacco control is a clear example of where promises failed to meet practice. It has been estimated that more than 10 cents on the dollar of funds from the 1998 Master Settlement Agreement with tobacco companies have been spent on tobacco control programs, despite promises that majority of the funds would be aimed at smoking prevention. Given the current fiscal imbalances at the state and federal levels, increased tax revenues generated through soda taxes would surely have a similar fate. Moreover, spending on tobacco control has been shown to exert trivial effects on cigarette consumption, thus calling into question the effectiveness of public spending on obesity prevention efforts.

We have argued that soda taxes are unlikely to correct any real or imagined problems related to our nation's ob
rate. It is not only unclear that soda causes obesity, but even if it did, policy makers have neither the technical expertise nor political courage to set taxes that correct any externality problems.

Even if policy makers did have such expertise, soda taxes would likely be regressive, as lower-income households spend a greater share of their income on soda than higher-income households. As such, soda taxes would disproportionately fall on the poor—soda drinkers who may or may not be obese. If non-obese individuals truly pay some of the higher health care costs of the obese, the best solution would be to correct this negative externality through imposing surcharges on health insurance premiums of the obese.

Periodical Bibliography

The following articles have been selected to supplement the diverse views presented in this chapter.

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