

Is There A Case For Changing Our Public Policy Toward Soda?

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ABSTRACT

In April 2009, Kelly D. Brownell and Thomas R. Frieden outlined a case for taxing sugared beverages in the New England Journal of Medicine. The authors conclude that a penny-per-ounce excise tax could decrease consumption by more than 10% and the tax revenues could be a key tool in efforts to improve people's health (Brownell and Frieden 2009). Since this time, many politicians have considered implementing large local or regional taxes on soda, with one of the more prominent efforts being New York State's effort in the Spring of 2010. A soda tax was even proposed as a possible form of paying for health care reform before being left out of the final bill. The reasons for the soda taxes come both from people who want to pay for health care costs and those who want to provide a price incentive to consume less soda. The soda tax debate has been continued through different media sources including newspapers, such as David Leonhardt's coverage in The New York Times, and in the blogosphere, most notably in N. Gregory Mankiw's blog. An excise tax is not the only public policy option and different options have enjoyed support from politicians from different ends of the political spectrum. Options can include anything from ending production subsidies for high fructose corn syrup to ending the purchase of soda using taxpayer funded programs like food stamps. In this paper, we will summarize the impact of sugary beverage consumption, the basic economic analysis of goods with negative externalities, several proposed policy changes, and finally our public policy recommendations.

INTRODUCTION

Several recent papers (Malik, Schulze, and Hu 2006, Vartarian, Schwartz, and Brownell 2007, and Fung, Malik, Rexrode, Manson, Willete, and Hu 2009) have linked sugar-sweetened

beverages to risks for obesity, diabetes, and heart disease. The presence of these links provides a basis for analysis regarding the public policy surrounding the soda industry. Recently the public policy debate has centered around the taxation of soda in cities like New York and Philadelphia as well as the District of Columbia. In each of these cases, government officials are deciding whether to consider the harmful health effects from soda consumption in a similar manner to the treatment of cigarettes. In this paper, we review the link between increased soda consumption and health risks, current public policy toward soda, and potential recommendations.

LINK BETWEEN SODA CONSUMPTION AND HEALTH

A recent meta-analysis of 88 studies supports an association between increased soda consumption and negative health outcomes such as obesity and diabetes (Vartanian et al 2007). High-fructose corn syrup (HFCS) is the primary sweetener in non-diet soft drinks. Between its introduction to the market place in 1970, and 2000, there has been over a 100 fold increase in per capita HFCS consumption, the majority of this coming from soda consumption (Bray et al 2004). There are several potential reasons for the association between increased soda consumption and negative health outcomes. These include the displacement of more nutritious beverages such as milk, the unique metabolic processing of fructose, and most importantly, increased caloric intake contributing to the obesity epidemic.

Trends in beverage consumption indicate that energy intake from sweetened beverages has dramatically increased at the expense of more nutritional beverages such as milk (Nielsen et al 2004). Twelve ounces of soda contains approximately 40 grams of sugar providing 150 calories. Except for calories and fluid, soda provides no other nutritional value. As soda displaces beverages such as milk, the consumption of important micronutrients such as vitamin A, riboflavin, vitamin D, calcium, phosphorus and potassium decrease. Long term consequences of micronutrient imbalances such as this include hypertension and osteoporosis.

The calories provided by soda are in the form of HFCS. Dietary fructose is metabolized differently than glucose, potentially leading to an increased risk of diabetes and heart disease (Bray et al 2004). The hepatic metabolism of fructose is such that high fructose consumption favors the synthesis of triglycerides, a risk factor for insulin resistance and heart disease. In addition, high fructose diets do not stimulate the hormones insulin and leptin to the same extent as equivalent amounts of glucose. Both insulin and leptin are known to induce satiety and decrease appetite. Low concentrations of these hormones, therefore, may contribute to excess caloric consumption and weight gain.

A temporal relationship exists between HFCS and the rising rates of obesity, although a causal association cannot be proven (Bray et al 2004). Obesity is a multi-factorial condition caused primarily by an imbalance in caloric intake and expenditure. From 1977 to 2001, as soda consumption increased, average caloric intake also increased by approximately 278 calories per day (Nielsen et al 2004). In children it is estimated that for each additional serving of sugar-sweetened drink consumed, body mass index (BMI), a measure of obesity, increases by 0.24 kg/m² and the chances of becoming obese increase by 60% (Ludwig et al 2001). It is well known that obesity is associated with greatly increased morbidity and mortality (Mokdad et al 2003). The prevalence of diabetes, high blood pressure, high cholesterol levels, asthma, arthritis, and overall poor health status increases with obesity. Compared to adults of normal weight

(BMI: 18.5-24.9), those with BMI of 40 or higher have over 7 times the risk of developing diabetes and over 6 times the risk of developing high blood pressure (Mokdad et al 2003). In obese individuals, conditions such as type II diabetes can be eliminated with weight loss. At the core of all successful weight loss programs is a decrease in consumption of energy-dense, nutrient-poor food items such as non-diet soda.

BASIC ECONOMIC ANALYSIS OF THE SODA INDUSTRY

There are three primary forms of market failure in the soda industry (Brownell et al 2010). Market failure is defined as a market condition where the free market outcome (absence of government involvement) fails to maximize net benefit for society and thus provides a justification for government intervention. The three sources of market failure in the soda industry are negative consumption externalities, imperfect information, and time-inconsistent preferences.

In most principles of microeconomics courses, students learn that in the absence of externalities, the competitive market yields the best result because it maximizes net benefit for society. However, this result does depend on the assumption of no externalities. An externality is defined as any activity in the production or consumption of a good that impacts people that are external to the market. Common examples of externalities include both negative and positive externalities. An example of negative externalities is air pollution from the electricity generated by burning coal. This externality occurs in the production of the good. The producer has private production costs but also introduces additional costs to society by decreasing the air quality and increasing the probability of health ailments such as asthma. An example of a positive externality is the consumption of education. In this case, consumers enjoy private benefits from education but also additional benefits to society by becoming more productive workers and better informed members of society.

In each case, the private market outcome is reached by firms attempting to maximize profit and consumers trying to maximize happiness. A firm will only consider its own costs when making a profit maximizing decision and a consumer will only consider his/her own happiness when making a decision. Thus, in the case of a negative externality, neither party takes into account the additional cost to society and we end up producing and consuming too much as compared to what is best for society (this is because nobody is accounting for the additional cost). In the case of a positive externality, neither party is considering the additional benefit for society, thus we end up producing and consuming too little as compared to what is best for society. In either case, the free market outcome fails to maximize net benefit for society and there is an argument as to how the government can alter the market outcome in order to increase net benefit for society.

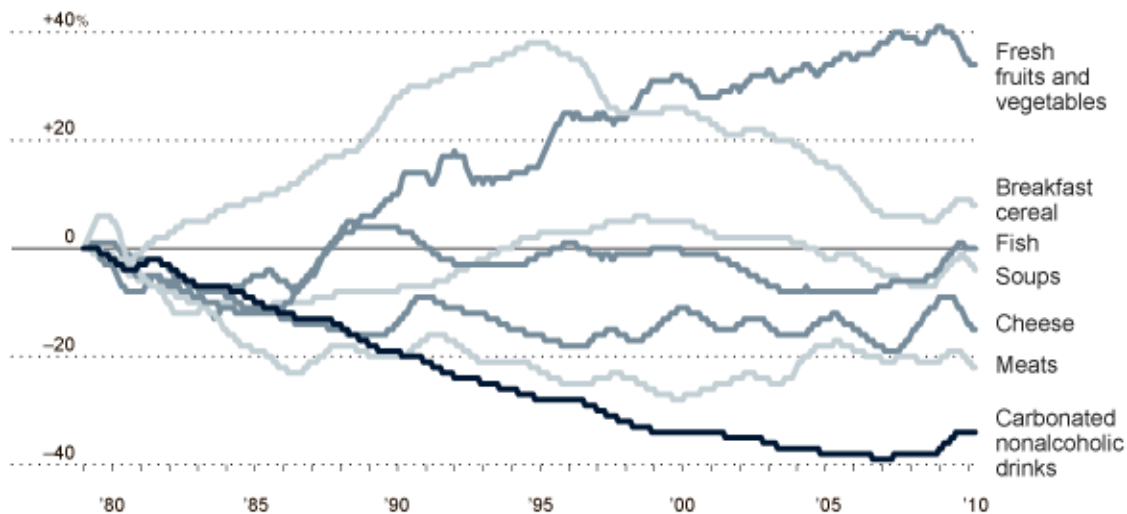
When some people have argued for the taxation of soda, they have compared it to the tobacco industry (Leonhardt 2010). Tobacco consumption has two main negative externalities in the impact of second-hand smoke and the increased health care costs. The first is an obvious negative externality because an individual who is not a smoker is incurring the negative health impacts of the cigarette smoke. However, the second stated negative externality is less obvious. When an individual decides to smoke, that individual will increase his/her probability of health risks. On the surface, this would appear to be a private cost and thus not an externality.

However, most people participate in group health care plans and premiums are based on overall health care costs, so an increase in an individual’s health care costs also increases the costs of others. In addition, if a person is a participant in Medicaid or Medicare, society pays for the higher health care costs. This increase in health care costs is the argument that is being made for a tax on soda.

The result of a free market outcome maximizing net benefit for society also relies on consumers and producers have accurate information. If consumers lack perfect information about the product they are consuming, they could be willing to pay more or less than the marginal benefit that they receive from the good. With soda consumption, we assume that the consumers lack the full nutritional information of soda and the links between soda consumption and negative health effects. Given consumers lack the full health effect information, they are willing to pay more and consume more soda than what is best for society.

The final form of market failure is a form of dynamic market analysis or the maximization of net benefit for society over time. In this case, consumers care more about short term happiness than long term health costs, thus being willing to consume more soda today than the optimal amount. In this case (as with the previous two) a public policy option to increase the price of soda can increase net benefit to society. As we see in the next chart, the price of soda has decreased over the last 30 years when compared to other goods with more nutritional value such as fresh fruits and vegetables.

Change in the price of items since 1978, relative to overall inflation, as measured by the Consumer Price Index.



Source: “The Battle Over Taxing Soda,” by David Leonhardt, The New York Times, May 18, 2010

According to our economic theory we need to decrease the consumption of soda in order to maximize net benefit for society and over the past 32 years the relative price of carbonated beverages has fallen 34 percent as compared to all other goods.

A DISCUSSION OF POLICIES

The first policy impacting the consumption of soda involves the production of soda. The most common form of sweetener in carbonated beverages is high fructose corn syrup which is made from corn. The 1930s New Deal programs that supported the production of corn originally were designed to assist the farmers and did not encourage cheaper corn (Pollan 2006). The original programs designated a price for corn and if the market price fell below an established price, then a farmer could take a loan from the federal government. This loan could be used to store the corn until market prices rebounded or, if it looked like the price might not rebound for a period of time, the farmer could sell the corn to the government to repay the loan.

However, beginning in the 1950s there was an effort to change the policy toward corn to be in line with many other commodities. Thus, future farm bills would switch the subsidy of corn away from the loan system to cash payments for an excess supply of corn. This would encourage farmers to produce even more corn and has led to a government subsidized low price of corn and thus an artificially low price of high fructose corn syrup. Given that this policy encourages more consumption of soda than a free market outcome, it actually encourages the opposite of what our economic analysis suggests should be done to achieve the optimal result for society.

The second policy is one that has been implemented on a small scale across the nation and been discussed on a much larger scale in selected localities. This policy is a per unit tax and is an example of a Pigouvian Tax. Named for the economist Arthur Pigou (1877 – 1959), the tax forces the market participants to take account of the additional cost to society. In order to achieve the optimal outcome for society, the amount of the tax would have to equal the external cost (not an easy task). However, even if the optimal outcome is not achieved, the outcome should be closer to optimal than a market outcome without a tax. In addition to accounting for the external cost, the tax revenues can be used to compensate local and federal governments who have faced increases in health care costs. The revenues can also be used to fund advertising campaigns to fight the previously mentioned information problem.

The third policy is the funding of soda purchases through allowing soda to be purchased by food stamps. In October 2010, Mayor Michael R. Bloomberg sought permission from the federal government to bar New York's food stamp recipients from using them to buy soda or other sugared drinks (Hartocollis 2010). In 2004, the Department of Agriculture denied a similar request from the State of Minnesota that asked for preventing the purchase of junk food. The economic rationale for prohibiting purchase of these goods with food stamps is very different than a general prohibition. The government is not denying anyone the "right" to purchase soda, however they are making the point that they will not subsidize the purchase through the food stamp program. There are currently such provisions for alcohol and a ban on soda would acknowledge the lack of nutritional value from soda and the imposition of social costs through consumption.

ANALYSIS OF POLICIES

Given that there is a link between increased soda consumption and increased health risks, we think the policies toward the soda industry should change. Currently, our public policy supports lower cost production of soda (through subsidies of corn production) and lower cost

consumption of soda for some consumers (through allowing the purchase of soda with food stamps). This is the exact opposite of what government intervention should be doing in the presence of negative externalities. There are a few approaches that can be taken to increase the net benefit for society.

First, the federal government could implement a per unit tax on soda. One of the more prominent critics of a per unit tax on soda as a Pigouvian tax is N. Gregory Mankiw. He argues that the negative externalities of increased health care costs are offset (at least partially) by a lower life span and thus lesser time collecting benefits such as social security (Mankiw 2010). If this logic were correct, we could make the same statement about air pollution and any other negative externality that introduces health care effects. Plus, if one were to make these arguments, one would have to include the increased productivity and thus wages of a healthier person, which would lead to additional tax revenues. Finally this line of argument would have to calculate all of the additional health care costs from the years lived with additional ailments as opposed to benefits such as social security paid to retirees. Unfortunately, there is no easy way to calculate these costs.

Suppose we accept the argument that the social costs are relatively small. In this case, the argument for a larger per unit tax would be difficult. However, the argument to eliminate the subsidy of high fructose corn syrup would still be valid. In a study published in the American Journal of Public Health, researchers found that consumption of soda was unchanged when participants were only informed about the negative health impacts of sugary beverage consumption, but decreased 18 percent when the information was accompanied by a price increase. Our current public policy is allowing the price of soda to stay relatively cheap because of the production subsidies for high fructose corn syrup. At the very least, this production subsidy should be ended.

Finally there is the issue of whether the government should be subsidizing consumption through food stamps. One of the original provisions of the Federal Food Stamp Act of 1964 was to provide a greater opportunity to obtain a low-cost nutritionally adequate diet. It is difficult to explain what the role of soda is in obtaining a nutritionally adequate diet, thus the ability to purchase soda should be questioned. As stated previously, this would not be the same as the government prohibiting the consumption of a good, but rather stating that it would not subsidize the consumption of this good.

CONCLUSION

Our current public policy of subsidized production and consumption of soda is contrary to the economic theory of market failure. When markets have negative consumption externalities, the government can take action to decrease the production and/or consumption in order to obtain the optimal outcome for society. However, the public policies of subsidizing both production and consumption lead to increases in production and consumption. There are two policies that can be adjusted and one policy enacted that can decrease the production and consumption of soda. First the government can end the production subsidy for high fructose corn syrup. Second, the government can end the ability for food stamp recipients to purchase soda. Finally the government can implement a per unit tax to force consumers and producers to account for the negative externalities from soda consumption.

REFERENCES

- Bray, George A., Nielsen, Samara J, and Popkin, Barry M. (2004). "Consumption of High-Fructose Corn Syrup in Beverages May Play a Role in the Epidemic of Obesity." *American Journal of Clinical Nutrition*, 79:4, 537-43.
- Block, Jason P., Amitabh, Chandra A, McManus, Katherine D. and Willett, Walter C. (2010). "Point-of-Purchase and Education Intervention to Reduce Consumption of Sugary Soft Drinks." *American Journal of Public Health*, 100:8, 1427-33.
- Brownell, Kelly D., and Frieden, Thomas R. (2009). "Ounces of Prevention — The Public Policy Case for Taxes on Sugared Beverages." *The New England Journal of Medicine*, 360, 1805-08.
- Fung, T.T., Malik, V.S., Rexrode, K.M., Manson, J.E., Willett, W.C., and Hu, F.B. (2009). "Sweetened Beverage Consumption and Risk of Coronary Heart Disease in Women." *The American Journal of Clinical Nutrition*, 89, 1037-42.
- Hartocollis, Anemona. "Unlikely Allies in Food Stamp Debate." *The New York Times*, October 16, 2010.
http://www.nytimes.com/2010/10/17/weekinreview/17hartocollis.html?ref=anemona_hartocollis.
- Leonhardt, David. "The Battle Over Taxing Soda." *The New York Times*, May 18, 2010.
http://www.nytimes.com/2010/05/19/business/economy/19leonhardt.html?_r=1.
- Ludwig, D.S., Peterson, K.E., and Gortmaker, S.L. (2001). "Relation Between Consumption of Sugar-Sweetened Drinks and Childhood Obesity: A Prospective Observational Analysis." *Lancet*, 357, 505-508.
- Malik, V.S., Schulze, M.B., Hu, F.B. (2006). "Intake of Sugar-Sweetened Beverages and Weight Gain." 84, 274-88.
- Mankiw, N. Gregory. "Can a Soda Tax Save Us From Ourselves?" *The New York Times*, June 5, 2010. < <http://www.nytimes.com/2010/06/06/business/06view.html> >.
- Mokdad, Ali H., Ford, Earl S., Bowman, Barbara A., Dietz, William H., Vinicor, Frank, Bales, Virginia H., Marks, James H. (2003). "Prevalence of Obesity, Diabetes, and Obesity-Related Health Risk Factors, 2001." *Journal of the American Medical Association*, 289:1, 76-79.
- Nielsen, Samara J. and Popkin, Barry M. (2004). "Changes in Beverage Intake Between 1977 and 2001." *American Journal of Preventive Medicine*, 27:3, 205-10.

Pollan, Michael. (2006). *The Omnivore's Dilemma: A Natural History of Four Meals*. Penguin Press, 48-53.

Vartanian, Lenny R., Schwartz, Marlene B., Brownell, Kelly D. (2007). "Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis." *American Journal of Public Health*, 97:4, 667-75.