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## EVALUATING EXCISE TAXES: THE NEED TO CONSIDER BRAND ADVERTISING

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*This article is part of a series of Policy Issues articles on Soda Tax. You can also find articles on [Should Soft Drinks be Taxed More Heavily?](#), [Can Taxing Sugary Soda Influence Consumption and Avoid Unanticipated Consequences?](#), [Sugar-Sweetened Beverage Taxation as Public Health Policy-Lesson from Tobacco](#), [Soda Taxes and Substitution Effects: Will Obesity be Affected?](#), [Better Milk than Cola: Soft Drink Taxes and Substitution Effects](#), and [Caloric Sweetened Beverage Taxes: The Good/Food/Bad Food Trap](#) as part of this theme.*

As city, state and the federal governments consider excise taxes on carbonated soft drinks (CSDs) or sugar-sweetened beverages (SSBs) there has been extensive discussion in academia and by public interest groups regarding the efficacy of such policy. The discussion has focused primarily on two issues: what would be the effect of excise taxes on consumption and ultimately obesity; and would these taxes be equitable—or, to what extent would they be regressive? To date, there have been numerous studies that examine the demand for CSDs or SSBs. Although there is variation in demand estimates depending on the level of aggregation—product versus brand—and market definition—which products to include, the results suggest that such excise taxes, if passed on to consumers, would lower consumption and generate revenue. However, the taxes would likely be regressive. Smith et al. (2010) provide a thorough discussion of the issue and the various economic implications of taxes on CSDs or SSBs.

Missing from the discussion and analyses of excise taxes, however, is the consideration of other marketing mix variables, particularly advertising. Although price effects are of obvious importance, advertising plays a significant role in affecting consumer behavior, including consumer price response. As such, advertising of CSDs and SSBs will impact the outcome of excise tax policies. Failing to consider the role of product advertising, especially in markets that rely so heavily on horizontal differentiation across subjective characteristics, leads to an incomplete understanding of the implications of excise taxes.

### **Pervasiveness of advertising and brand identity**

Given the number and variety of CSDs and SSBs, horizontal product differentiation can be essential to competing firms (Bagwell, 2007). Consequently, CSD and SSB firms spend significant amounts of money on television advertising alone. Although there are other forms of advertising, this article focuses on television advertising which has the highest expenditures and is most prominent. Table 1 shows a list of major CSD and SSB brands and their television advertising expenditures for 2009 (Kantar Media, 2009). The Coca-Cola Company spent over \$60 million on their flagship product Coca-Cola Classic, PepsiCo spent over \$20 million on Pepsi and Dr. Pepper-Snapple spent over \$20 million on Dr. Pepper. Even Gatorade, a sports drink, spent over \$30 million on television advertising for various products. Further, the majority of expenditures were for network advertising which reaches a larger audience.

**Table 1****Carbonated Soft Drink and Sugar Sweetened Beverage Television Advertising, 2009 (\$'000's)**

Brand	Network	Spot	Syndication	Cable	Total
Coca-Cola					
Classic Soft Drink	\$18,820	\$987	\$3,300	\$7,709	<b>\$60,816</b>
Sprite Soft Drink	\$2,396	\$118		\$4,984	<b>\$7,498</b>
Pepsi Soft Drink	\$17,332	\$33		\$3,206	<b>\$20,570</b>
Mountain Dew Soft Drink	\$808	\$98		\$128	<b>\$1,034</b>
Dr Pepper Cherry Soft Drink	\$9,479	\$161	\$3	\$5,095	<b>\$14,738</b>
Dr Pepper Soft Drink	\$13,404	\$1,905	\$16	\$6,176	<b>\$21,501</b>
A & W Root Beer Soft Drink		\$24		\$4,990	<b>\$5,015</b>
Gatorade Tiger	\$5,164	\$279	\$1,895	\$2,077	<b>\$9,414</b>
Gatorade G2	\$9,074	\$13	\$1,899	\$3,946	<b>\$14,932</b>
Gatorade Various RTS Sports Drink	\$19,804	\$1,068	\$4,632	\$8,419	<b>\$33,923</b>
Gatorade RTS Beverage	\$21,661	\$702	\$4,595	\$6,651	<b>\$33,609</b>
Kool-Aid Presweetened Fruit Drink Mix	\$1,238	\$15	\$295	\$1,664	<b>\$3,212</b>
Kool-Aid Presweetened & Unsweetened Fruit Drink Mix	\$3,320	\$54	\$1,211	\$5,630	<b>\$10,215</b>

SOURCE: Kantar Media, 2009

CSD and SSB firms generally employ a pulsing advertising strategy which involves high-frequency, year-round television advertising. Contrast this with one-time only or continuous advertising campaigns. Pulsing advertising has been shown to be more effective at generating more advertising exposure for lower costs (Dube, Hitsch, and Manchanda, 2005). As such, consumers are steadily exposed to CSD and SSB television advertising.

A common metric used to evaluate advertising is Gross Ratings Points (GRPs), which measure the percentage of audience reached by an advertisement times the frequency of the advertisement. Figure 1 plots weekly television GRPs for all Coca-Cola products from 2006-2008 for children under 12 and for adults. The steady stream of pulse advertising is apparent, with the summer months experiencing more frequency and the winter (February 2006) and summer (August 2008) Olympics having large spikes. Interestingly, Coca-Cola does not directly advertise to child-dominated audiences, according to their advertising pledge (Better Business Bureau, 2011). Yet the GRPs for children are persistent and tend to follow adult GRP trends. Clearly, CSD brand advertising is pervasive and is viewed by broad audiences, not just those who are directly targeted.

Television brand advertising has also been shown to create long-term brand identity as well. McClure et al. (2004) examined how Coke and Pepsi affected brain activity of volunteer subjects during a taste test. They found that tasting each soft drink activated reward areas of subjects' brains that are associated with pleasure and satisfaction. More importantly, when participants were told they were drinking Coke, not only did the reward areas become active, but the memory regions of the brain as well. According to the researchers, "[Their study] showed that the brand alone has value in the brain system above and beyond the desire for the content of the can." (Park, 2007). The effect of excise taxes on consumption will be influenced by such powerful brand identity.

### Effect of Advertising on Demand

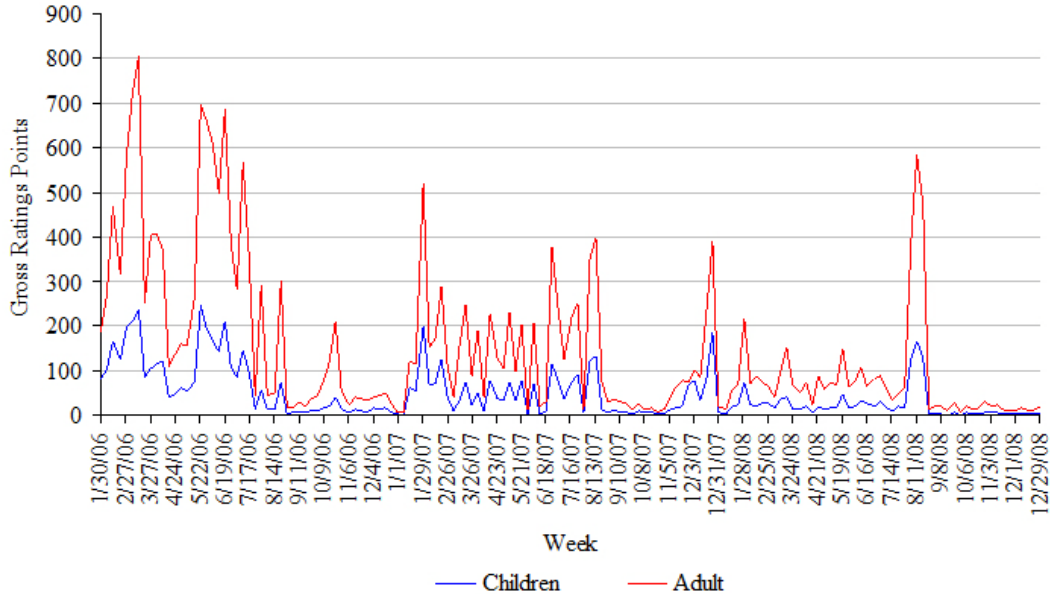
With such strong advertising efforts and the brand loyalty it creates, advertising of CSDs and SSBs can have a significant impact on the effectiveness of excise taxes. Obviously, many studies do not include advertising due to a lack of data. An important question, then, is what impact does the omission of advertising variables have on analyses of excise taxes?

### Price Elasticity

Omitting advertising from empirical demand analyses will affect estimates of demand elasticity—the percentage change in quantity demanded corresponding to a percentage change in price—as advertising both shifts and rotates demand depending on the type of advertising (Johnson and Myatt, 2006). Erdem, Keane and Sun

(2008) find that for 17 of 18 product lines, television advertising rotates demand counterclockwise—increasing demand elasticity—suggesting that advertising increases the number of consumers willing to pay for a particular product. The one exception where demand rotated clockwise, they suggest, was due to the industry having a few number of firms and greater emphasis on horizontal differentiation. Focusing explicitly on soft drink advertising, Zheng, Kinnucan, and Kaiser (2010) find that television advertising rotates the demand curve for soft drinks counterclockwise. The authors suggest that such advertising has its greatest appeal among consumers with low WTP for soft drinks.

**Figure 1: Coca-Cola Television Gross Ratings Points for Children and Adults, 2006-2008**



While the above-mentioned studies find advertising makes demand estimates more elastic, others find the opposite effect. Krishnamurthi and Raj (1985) find that brand-level demand estimates are significantly more inelastic as advertising is increased. In an extensive evaluation of numerous product lines, Ataman, Van Heerde and Mela (2010) also find that, in general, television advertising makes products more inelastic.

Based on the existing literature, it is apparent that elasticity estimates that do not account for advertising will be biased. Consequently, so will the estimated impact of excise taxes. Further, it appears that the direction of the bias due to omitting advertising is unclear and should be determined by empirical analysis. Advertising for CSDs and SSBs may make the demand curve more elastic while also increasing demand if it recruits marginal consumers to begin consuming. Alternatively, since a few CSD firms have significant market share, advertising may be used for horizontal product differentiation and therefore make consumers more price insensitive.

It is possible to mitigate biased price estimates using existing econometric techniques such as instrumental variables which rely on replacing the price variables with acceptable substitute variables. There are two important shortcomings, however. First, from an econometric perspective, it can be difficult to find appropriate substitutes for prices. More importantly, instrumental variables estimates do not provide the same information as estimates of advertising and advertising-price interactions. That is, they do not answer what direct effect advertising has on demand and to what extent advertising impacts price effects.

### ***Tax Regressivity***

Advertising may have varying effects on different household types. The extent of the regressivity of excise taxes may be lessened or exacerbated by product advertising. If advertising makes demand more inelastic for low income households, then excise taxes will be even more regressive than previously estimated. Alternatively, if higher income households are more sensitive to advertising, then excise taxes may be less regressive. Therefore, the heterogeneous effect of advertising across households should be considered to fully understand the burden of excise taxes.

### ***Other Advertising Effects***

Advertising not only affects price estimates, it also directly impacts demand for CSDs and SSBs (Zheng and Kaiser, 2008). While excise taxes target CSD and SSB prices, excise taxes have no direct impact on advertising. Firms may change their advertising or marketing strategies following the implementation of excise taxes. For example, CSD and

SSB firms could increase their advertising efforts to offset any price changes resulting from excise taxes. It is important to understand the extent that advertising effects may compete with price effects.

Another issue to consider is that advertising can impact substitution patterns between products which are an important consideration when examining excise taxes, as consumers switch from one product to another (Fletcher et al. 2010). For example, Zheng and Kaiser (2008) find that advertising for soft drinks has a spillover effect on other beverage categories which impacts the degree of product substitution. Failing to account for how advertising affects switching behavior will misrepresent the impact of excise taxes on overall consumption.

### **Opportunities**

There are also opportunities to use advertising to promote healthful alternatives. Previous literature on information campaigns finds that promoting healthful consumption has been shown to have an affect on consumer choices. For example, the 5-a-day campaign promoting consumption of fruits and vegetables is shown to increase consumption across numerous countries (Pomerleau et al., 2005; Capacci and Mazzocchi, 2011). Information campaigns are generally delivered using educational materials or other non-commercial media and venues (Pomerleau et al., 2005). Television advertising has the ability to reach a much larger audience than information campaigns. Promoting healthy foods using television advertising could enhance the effect of excise taxes by increasing substitution to more healthful alternatives.

There may be benefits from reducing or restricting advertising as well. The Children's Food and Beverage Advertising Initiative (CFBAI) is a voluntary, industry lead program currently comprised of 17 large food and beverage companies who have volunteered to restrict advertising of unhealthful foods to children. The Interagency Working Group on Food Marketed to Children is a similar government lead initiative currently in development. Although there is no evidence of any short-term effect of restricting advertising to children, there may be long-term benefits to such efforts.

### **Concluding Comments**

In the continuing discussion of excise taxes on CSDs and SSBs, it is important to understand what revenues will be generated by the taxes, who will bear the burden of the taxes and what effect, if any, they will have on consumption or obesity. Brand advertising has a clear effect on both consumption and consumer perceptions of brand identity. Given the high level of CSD and SSB advertising, it is essential to understand how advertising affects consumer demand for CSDs and SSBs.

### **For More Information**

Ataman, M. B., Van Heerde, H.J., and Mela, C. F. (2010). The long-term effect of marketing strategy on brand sales. *Journal of Marketing Research*, 47, 86-882.

Bagwell, K. (2007). *The economics of advertising*. In Handbook of Industrial Organization, vol 3. Ed by M. Armstrong and R. Porter.

Becker, G.S., and Murphy, K.M. (1993). A simple theory of advertising as a good or bad. *Quarterly Journal of Economics*, 108, 942-964.

Better Business Bureau. (2011). Current participants' pledges: The Coca-Cola Company, 2010 Restated Pledge. Available online: <http://www.bbb.org/us/storage/0/Shared%20Documents/coke%20final.pdf>.

Capacci, S., and Mazzocchi, M. (2011). Five-a-day, a price to pay: An evaluation of the UK program impact accounting for market forces. *Journal of Health Economics*, 30, 87-98.

Dube, J.P., Hitsch, G.J., and Manchanda, P. (2005). An empirical model of advertising dynamics. *Quantitative Marketing and Economics*, 3, 107-144.

Erdem, T., Keane, M.P., and Sun, B. (2008). The impact of advertising on consumer price sensitivity in experience goods markets. *Quantitative Marketing and Economics*, 6, 139-176.

Fletcher, J.M., Frisvold, D.E., and Tefft, N. 2010. The effects of soft drink taxes on child and adolescent consumption and weight outcomes. *Journal of Public Economics*, 94, 967-974.

Johnson, J.P., and Myatt, D.P. (2006). On the simple economics of advertising, marketing, and product design, *American Economic Review*, 96, 756–784.

Kantar Media. (2009). Ad \$ Summary: Multi-Media Service, January-September 2009.

Krishnamurthi, L., and Raj, S.P. (1985). The effect of advertising on consumer price sensitivity, *Journal of Marketing Research*, 22, 119–129.

McClure, S.M., Li, J., Tomlin, D., Cypert, K.S., Montague, L.M., and Montague, P.R. (2004). Neural correlates of behavioral preference for culturally familiar drinks. *Neuron*, 44, 379–387.

The Nielsen Company. (2009). National Television Data, January 30, 2006-January 4, 2009.

Park, A. (2007, January 29). The brain: Marketing to your mind. *Time*, 169, 114-115.

Pomerleau, J., Lock, K., Knai, C., and Mckee, M. (2005). Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *Journal of Nutrition*, 135, 2486–2495.

Smith, T.A., Biing-Hwan, L., and Jonq-Ying, L. (2010). Taxing Caloric Sweetened Beverages, Potential Effects on Beverage Consumption, Calorie Intake, and Obesity. ERR-100, U.S. Department of Agriculture, Economic Research Service, July 2010.

Zheng, Y., and Kaiser, H.M. (2008). Advertising and U.S. nonalcoholic beverage demand. *Agricultural and Resource Economics Review*, 31, 147-59.

Zheng, Y., Kinnucan, H., and Kaiser, H.M. (2010). Measuring and testing advertising-induced rotation in the demand curve. *Applied Economics*, 42, 1601-1614.

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