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# **The Impact of Social Media Conversations on Consumer Brand Choices**

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INTRODUCTION

Word-of-mouth (WOM) via social media has become a key driver of brand recommendation among consumers, prompting an increasing number of companies to promote their products and services through social media in order to stimulate consumer conversations, increase consumer loyalty and acquire new customers (Hoffman and Fodor, 2010; Financial Times Special Report, 2012). By facilitating WOM, social media have significantly altered the balance of marketing communication from unidirectional (firms to consumers as in traditional advertising) to bidirectional (among consumers) in many consumer markets, from soft drinks and breakfast cereals to popular fast food chains.

Social media consumer-to-consumer exchange is a relatively new type of online WOM. Most previous studies have focused on the effects of internet penetration and the interaction between online and offline company advertising. Regarding WOM, studies have focused on the effects of online WOM on product sales. In spite of the growing importance of social media WOM, there is a lack of empirical evidence on its effects on consumer preferences and choices for branded products.

This article investigates the impact of social media conversations on U.S. consumers’ preferences in the carbonated soft drinks (CSDs) market. This market provides a good case study for examining the effects of social media conversations on consumer brand choices for several reasons. First, the CSD market is characterized by a strong presence of company social media websites and consumer conversations, particularly those aimed at the industry leader, the Coca-Cola Company—the most popular among Facebook users and other social media communities in the food and beverage sector (Forbes, 2013). Second, the products are differentiated at the brand level so that the effects of brand and nutrition conversations on sales of particular brands can be discerned. Third, there is public health interest in potential policy instruments, such as advertising or social media, that affect the consumption of sugary CSDs due to the ongoing obesity epidemic in which CSDs have been identified as an important contributor. Understanding how social media WOM affects consumer valuation of characteristics and choices of CSD products can be helpful in understanding and informing firm strategies aimed at effectively designing and promoting products.

MODEL

A random coefficient logit model of consumer demand is estimated, following Berry, Levinsohn and Pakes (1995; hereafter BLP). Assume that there is a total number of J CSD products on the market. Use  $j = 1, \dots, J$  to denote a CSD product in the sample and  $j = 0$  to denote the outside products in the beverage market. A consumer chooses a CSD brand among competing products (or an outside good) and maximizes utility, given social media exposure as well as product and his/her own characteristics. The conditional indirect utility of consumer  $i$  from purchasing CSD product  $j$  in market  $m$  is

$$U_{ijm} = \alpha_i p_{jm} + \beta_i x_j + \gamma_i Lexis_m + \phi_{1i} SM_{jm}^{brand} + \phi_{2i} SMScore_{jm}^{brand} + \kappa_{1i} SM_m^{nutrition} \times x_j + \kappa_{2i} SMScore_m^{nutrition} \times x_j + \mu_1 Dummy_{Season} + \mu_2 Dummy_{DMA \times SM} + \xi_{ijm} + \varepsilon_{ijm},$$
$$= \delta_{jm} + \mu_{ijm} + \varepsilon_{ijm}$$

where  $p_{jm}$  is the unit price per ounce of CSD brand  $j$  in market  $m$ ,  $x_j = (sugar_j, sodium_j, caffeine_j)$  is a vector of observed nutritional characteristics of CSD brand  $j$  and  $\xi_{jm}$  is unobserved product characteristics.  $Lexis_m$  is the general media coverage goodwill that captures health information received by consumers. Social media goodwill enters the utility functions directly:  $SM_{jm}^{brand}$  is the social media WOM which captures all conversations and communications mentioning CSD brand  $j$ ;  $SMScore_{jm}^{brand}$  is the social media score of product  $j$  in market  $m$ .  $SM_m^{nutrition} = (SM_m^{sugar}, SM_m^{caffeine})$  is a vector capturing all conversations about nutritional factors. The interaction terms  $SM_m^{nutrition}$  and product characteristics  $x_j$  will indicate how those social media conversations on nutritional factors affect consumers’ preferences.  $SMScore_m^{nutrition}$  is a vector of social media scores of the nutritional factors.  $Dummy_{Season}$  is a vector of season dummy variables and  $Dummy_{DMA \times SM}$  is a vector of dummy variables that captures the interaction of DMA and social media volume.

Following Dubé, Hitsch and Manchanda (2005), social media exposure is modeled as goodwill in order to capture the carry-over effects on demand, following a distributed lag form:

$$SM_{jt}^{brand} = \sum_{k=0}^K \lambda^k \psi(sm_{jt-k}^{brand})$$

where  $\psi(\cdot)$  is a social media goodwill production function;  $m_{jt}^{brand}$  is the number of conversations mentioning brand  $j$  at time  $t$ ;  $\lambda$  is a geometric decay factor; and  $t$  and  $k$  denote time periods.  $SM_m^{nutrition}$  and  $Lexis_m$  are modeled in a similar way.

Aggregating over consumers, the market share of CSD product  $j$  in market  $m$  is then given by

$$s_{jm} = \int I\{(v_i, \epsilon_{ijm}): U_{ijm} \geq U_{ikm} \forall k = 0, \dots, J\} dG(v) dF(\epsilon)$$

where  $v$  is a vector of  $v_i$  (the consumer-specific deviations) and  $\epsilon$  is a vector of  $\epsilon_{ijm}$  and  $G(v)$  and  $F(\epsilon)$  are their cumulative density functions, assumed to be independent of each other. matching the predicted market shares with observed ones, we solve for the model parameters using the Generalized Methods of Moments. The estimated coefficients are then used to evaluate how consumers’ preferences are affected by social media conversations.

DATA AND ESTIMATION

Two Nielsen Company datasets are used at the product brand level: CSD sales data and social media data, both obtained from the Zwick Center for Food and Resource Policy at the University of Connecticut. Monthly sales data on 18 CSD brands were collected over 12 Designated Market Areas (DMAs) from April 2011 through October 2012. These data include DMA-level data consisting of dollars sales, volume sales, and prices for diet and regular CSDs for supermarkets with more than \$2 million annual sales.

The social media data cover the time period April 2011 through October 2012, matching the sales data. In 2011, the Nielsen Company started monitoring and collecting social media content for beverage products from various publicly available online social media communities such as Facebook, YouTube, and Twitter. For example, there are conversations like “ordering diet Coke with chips because you’re healthy and not going to get any fatter with your meal because it’s diet Coke,” “Seem like Pepsi drinks is getting stronger every day” or “Co-op had a half-price offer on Pepsi 2 liter.” Specifically, Nielsen measures the volume of discussion or number of messages mentioning specific CSD brands in conversations in a day. Every time a consumer talks about a CSD brand on social media, the company gains increased exposure for its brand. Such increased brand awareness strengthens the association of the brand in consumers’ minds and affects product demand. Upon request, Nielsen also used codes to measure the sentiment expressed regarding each product (positive, negative, or neutral) in each conversation or WOM during the sample period.

In addition, we collected social media conversations and consumer sentiment about sugar and caffeine content of CSD products. As shown in Figure 1, consumers’ social media conversations regarding sugar skyrocketed in the sample period, rising from 6,557 in April 2011 to 20,055 in October 2012. This pattern reflects the public’s increasing awareness of sugar-related health issues. On average, there were 13,611 conversations on sugar and 6,554 conversations on caffeine recorded per month. The sentiment scores are -0.09 and -0.06 for sugar and caffeine content in CSDs, respectively, suggesting an overall negative attitude. More consumers looking for and sharing nutritional and health information through social media will help to identify how social media affect consumers’ preferences for nutritional content of a CSD brand. It also is interesting to notice that, in contrast to the rising nutrition-related conversations as well as the negative sentiments associated with them, total CSD sales of all brands in our sample experienced a slightly downward trend during the same period, paralleling a broad decline in U.S. consumption of CSDs in the same period .

Figure 1: U.S. Social Media Conversations on Sugar and Caffeine and CSD Sales

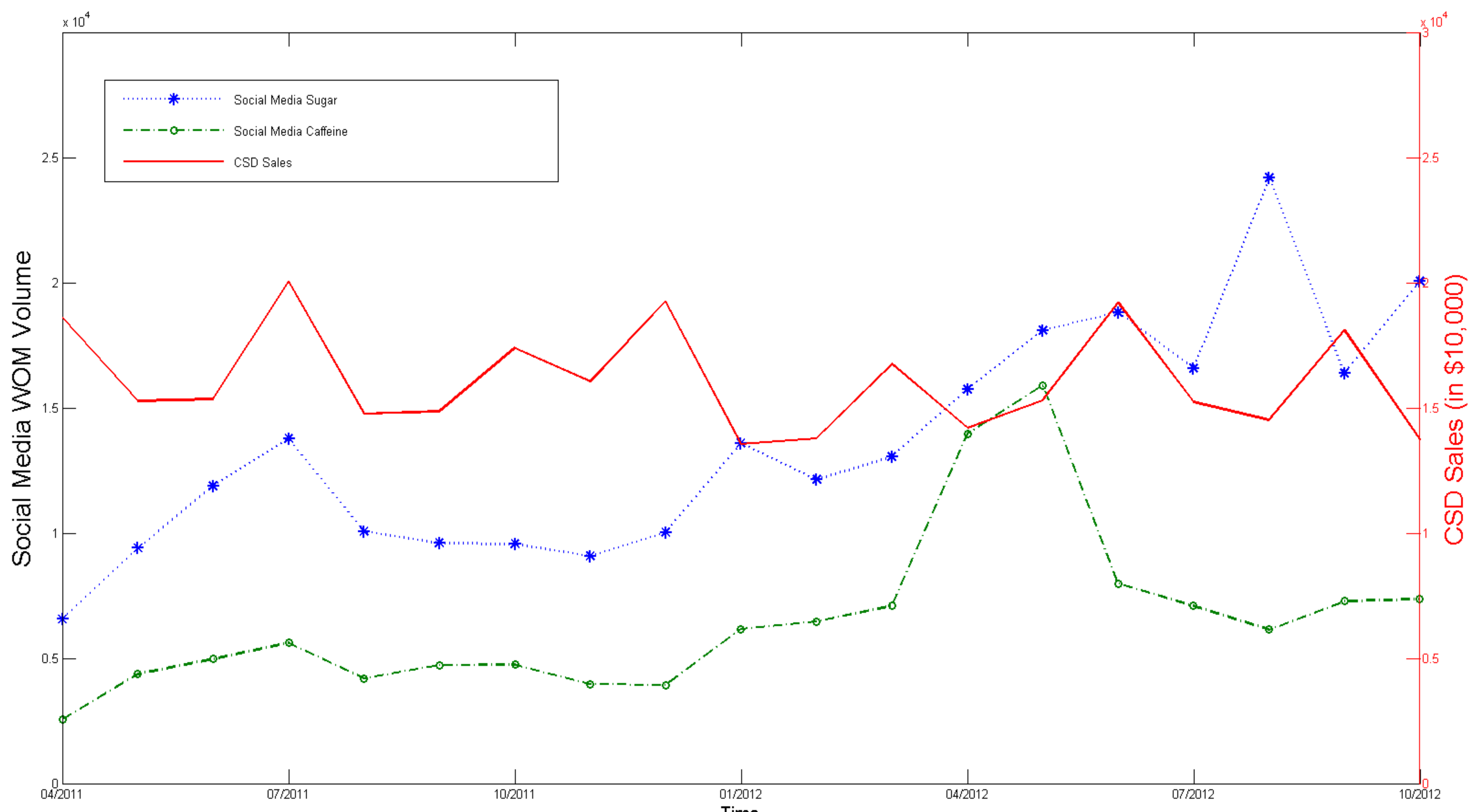


Table 1: Summary Statistics: Averages across Cities and Months

Brand	Sugar (g/oz)	Sodium (mg/oz)	Caffeine (mg/oz)	Price (cents/oz)	Market Share (%)	Social Media WOM Brands -1,000	Social Media Score
All in Sample	1.94	4.17	2.2	2.69	7.7	58.72	0.18
Coca-Cola							
Coke Classic Regular	3.25	4.17	2.92	2.83	31.07	429.8	0.05
Coke Diet	0	3.33	3.92	2.9	18.72	89.33	-0.06
Sprite Regular	3.17	5.83	0	2.88	8.43	14.33	0.06
Coke Zero Diet	0	3.33	2.92	2.97	5.52	14.85	0.01
Fanta Regular	3.67	4.58	0	2.61	3	30.47	0.42
Pepsi							
Pepsi Regular	3.42	2.5	3.17	2.54	23.64	315.19	0.17
Pepsi Diet	0	2.92	2.92	2.65	12.47	11.43	0.05
Mountain Dew Regular	3.83	5.42	4.5	2.81	10.17	47.83	0.06
Sierra Mist Regular	3.25	3.17	0	2.54	2.65	3.85	0.34
Mountain Dew Diet	0	4.17	4.5	2.77	3.46	3.39	0.4
Mountain Dew CR Reg.	3.75	8.75	4.5	2.71	0.52	0.65	0.17
Sierra Mist Free Diet	0	3.17	0	2.33	1.06	0.14	0.43
Dr. Pepper							
Dr Pepper Regular	3.33	4.58	3.5	2.92	6.94	75.15	0.1
Dr Pepper Diet	0	4.58	3.5	2.9	3.22	2.74	0.11
Sunkist Regular	4.17	5.83	3.33	2.53	2.58	4.21	0.36
7 Up Regular	3.17	3.33	0	2.53	3.6	13.02	-0.08
7 Up Diet	0	5.42	0	2.6	1.8	0.31	0.32
Diet Rite Pure Zero Diet	0	0	0	2.46	0.4	0.21	0.33

Note: These are averages across 12 cities and 17 months. The cities are New York, Detroit, Atlanta, Chicago, Los Angeles, Boston, Hartford/New Haven, Syracuse, Dallas, Miami, San Francisco, and Seattle. The months include June 2011 through October 2012. Social media conversations for brand and price are over city-month combinations.

Table 2: Demand Estimates of Consumer Preference in the CSD Market

	Mean Preference		Deviations	
	Mean	Std.Err	Mean	Std.Err
Price	-0.449***	0.156	0.376***	0.11
Sugar	-0.074	0.126	-0.751***	0.08
Sodium	-0.249***	0.034	-0.341***	0.031
Caffeine	0.309***	0.119	-0.116	0.127
Lexis Health Media Coverage	-2.137***	0.21	-1.242*	0.751
Social Media Brand	4.599***	0.445	0.691*	0.416
Social Media Brand Score	-0.297	0.384	0.102	0.304
Social Media Sugar × Sugar	-45.284***	3.776	47.556***	1.325
Social Media Caffeine × Caffeine	-7.717***	3.839	0.358	4.324
Social Media Sugar Score × Sugar	0.037	0.07	-0.36	0.347
Social Media Caffeine Score × Caffeine	0.05	0.343	-1.327*	0.794
Constant	-4.603***	0.78	-0.453	0.444
Season Summer	0.681***	0.182		
Season Fall	0.741***	0.226		
Season Winter	0.636***	0.16		
DMA Social Media Interaction Dummies	Yes			

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



The top ten soda brands in the U.S.

RESULTS

How does word-of-mouth (WOM) and social media affect consumer’s preferences and choices in the carbonated soft drink (CSD) market?

Research shows that consumer exposure to WOM on various social media sites can be a significant driver of consumer purchasing behavior.

Consumers’ conversations about brands and nutritional aspects of CSDs have a significant impact on their preferences.

However, the volume of WOM rather than the sentiment is what matters the most. This has important implications not only for firm strategy but also for public health policy aimed at influencing consumer diets.

Further, based on the demand parameter estimates, we simulate the market shares for all brands under alternative scenarios. (1) No specific social media conversations on each brand: setting the brand social media goodwill for all CSD products to zero, while assuming other variables at constant levels. (2) A national health campaign on CSDs, which leads to increasing discussion of sugar on social media sites, assuming the total social media conversations regarding sugar is increased by 10% . (3) No social media conversations regarding caffeine.

We find that Coke and Pepsi would experience the largest decrease in market shares without brand social media conversations and that sugary CSDs would suffer larger losses with a higher level of conversations about sugar.

Implications

Managers that want to make use of social media WOM about their products should actively monitor or even spur more conversations about their brands on various social media sites.

Given the lower cost of information conveyed through the internet and social media in particular, consumers now pay more attention to the nutritional content of food and beverage products. It is therefore important to monitor consumers’ attitudes and sentiments regarding product attributes.

From a public policy perspective, this analysis has additional benefits for public health policy makers. Our results imply that a national public health campaign that raises consumer conversations about sugar, for example, can be effective in decreasing the consumption of sugary CSDs.

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