Spatial Price Competition in the Non-Alcoholic Beverage Industry in the United States

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Background

Non-alcoholic beverage market in the United States is a multi-billion dollar industry growing steadily over the past decade (American Beverage Association, 2011). According to the U.S. Department of Labor, Bureau of Labor Statistics (2011), the consumer price index (CPI) for all urban consumers for non-alcoholic beverages is on the rise. Furthermore, there is a wide variation in non-alcoholic beverage prices in the United States both regionally as well as locally within a region (Todd and Leitbag, 2010; Todd et al., 2011).

Although the extant literature has discussed price variation, to the best of knowledge, we could not find any article attributing variation in prices either merely to random events or to patterns of spatial price dependence and/or competitiveness.

Spatial price competitiveness among products and locations has been used by economists, market researchers and strategists to identify patterns of substitutability (Kalnins, 2003), and market boundaries (Stigler & Sherwin, 1985; Flore, 1988). Spatial price correlation of a given product speaks to substitutability among locations where the product is purchased or in other words, competition among stores for given product (such as carbonated soft drinks manufactured by Coca Cola®).

This information will be vital to retailers in the competitive marketplace in determining an appropriate pricing strategy for their products.

We will center attention on brand level non-alcoholic beverage product prices, delineating spatial dependence across different channel types where the product is sold such as grocery stores, drug stores, convenience stores and mass merchandisers. Initially, as a pilot study, we will concentrate on these aforementioned channel types where the product is sold such as grocery stores, drug stores, convenience stores and mass merchandisers.

Methodology

Reduced-form spatial price competition model (such as in Kalnins, 2003) is used to determine whether any spatial relationship of prices of selected brand-level non-alcoholic beverage products is merely random or responds to a pattern of spatial dependence. Spatial econometrics has been used extensively in the past in development research (Case, 1991), sociological and technological diffusion processes (Anselin et al., 1997), clustering of contract types among gasoline retailers (Pinkse and Slade, 1998), and price competition among gasoline wholesalers (Pinkse et al, 2002). Extensive theoretical foundations of spatial econometrics can be found in Anselin (1988).

The reduced-form spatial price correlation model can be represented by two autoregressive models given by:

\[ y = \sum_{i=1}^{n} \beta_i W_{ij} y + X \beta + \epsilon \]

where \( y \) is a vector of \( n \) observations of prices at different channel types \( P_{ij} \) is the autoregressive coefficient associated with matrices \( W_{ij} \), \( W_{ij} \) is non-spatial weight matrices, where \( i=1,2,\ldots,A \) the total number of all matrices \( X \) is a matrix of exogenous variables \( \beta \) is a vector of \( k \) parameters \( \epsilon \) is a vector of \( n \) error terms with expected value \( E[\epsilon_i]=0 \) \( \mu_{ij} \) is autoregressive coefficient associated with matrices \( M_{ij} \), \( M_{ij} \) is non-spatial weight matrices, where \( b=1,2,\ldots,B \) the total number of matrices \( \zeta \) is a vector of \( n \) spherical-error terms

Results and Discussion

We are in position to glean information about spatial correlation of brand-level non-alcoholic beverage product prices across grocery stores, drug stores, convenience stores and mass merchandisers, for the state of Texas.

These price correlations help us shed light on location substitutability of selected brand-level non-alcoholic beverage products by consumers, hence market boundaries.

Finally, spatial price correlations would help us determine appropriate pricing strategies across competing stores for the particular brand-level non-alcoholic beverage product.

References

American Beverage Association, 2011

Objectives

(1) to identify spatial price correlation of branded non-alcoholic beverage product delineated by different channel types, such as grocery stores, drug stores, convenience stores and mass merchandisers;

(2) to identify location (channel type) substitutability for specific non-alcoholic beverage products purchased by consumers, hence determining market boundaries.

(3) to determine appropriate pricing strategies for branded non-alcoholic beverage products in the light of spatial price dependence across channel types.