

Are national brands more promotion elastic than store brands?

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Abstract. Are national brands more discount elastic and display/feature elastic than store brands? This research tests this traditional view using a dataset comprising of 18 brands from five retail chains, 424 SKUs and 24,260 observations that account for over 90% of the Carbonated Soft Drinks category sales. Our results indicate that, on aggregate, there are no significant differences in response elasticities between national brands and store brands. However, leading national brands in popular subcategories conform to a large extent to the traditional view of being more promotion elastic than store brands. Implications of these findings for managers and directions for future research are discussed.

Keywords. National brands, Store brands, Retail promotion strategy, Market response

1 Introduction

National brands in grocery products are traditionally viewed as higher-quality, higher-priced, image-oriented brands while store brands are viewed as lower-quality, lower-priced, value-oriented brands. This traditional view, combined with the asymmetric price tier effect theory of Blattberg and Wisniewski (1989), suggest that national brands are more own promotion elastic than store brands. In this research, we explore the following two questions using aggregate multi-retailer, multi-subcategory data set for the carbonated soft drink category.

- a) *Are national brands more discount elastic than store brands? That is, are national brand sales more responsive to its own temporary price reduction than store brand sales are to its price reductions?*
- b) *Are national brands more display/feature elastic than store brands? That is, are national brand sales more responsive to its own display/feature than store brand sales are to its display/feature?*

2 Model

To measure market response in the form of promotional elasticities, we employ the popular log-log specification of demand in which the log of sales volume is regressed over the log of demand determinants (e.g., Mace and Neslin 2004). In particular, we model the sales at retail chain (r) of stock Keeping Unit - SKU (j) belonging to brand (b) in time (t) as a function of the own price and promotional variables for that SKU in that time period and other variables that may influence its sales.

$$(1) \ln(\text{Sales}_{rjt}) = \alpha_0 + \beta_{1rb} \ln(\text{Price}_{rjt}) + \beta_{2rb} \ln(\text{Pricered}_{rjt}) + \beta_{3rb} \ln(\text{Dispfeat}_{rjt}) + [\text{covariate terms}] + [\text{Error}], \text{ where}$$

Sales_{rjt} = Volume sales of SKU(j) in retailer(r) at time (t).

Price_{rjt} = Price per volume of SKU(j) in retailer(r) at time (t).

$Pricered_{ijt}$ =	Temporary Price reduction of SKU(j) in retailer(r) at time (t).
$Dispfeat_{ijt}$ =	Display/feature of SKU(j) in retailer(r) at time (t).
β_{1rb} =	own price elasticity (OPE) measured at the brand level (b)
β_{2rb} =	own temporary price reduction elasticity (TPE)
β_{3rb} =	own display/feature elasticity (DFE) measured at brand level

Covariates used in this model used for estimating own promotional elasticities of national brands and store brands in Carbonated Soft Drinks (CSD) category include competitive marketing mix variables, seasonality (spring, summer, fall, winter), package type (glass, plastic, aluminum), package size (12 oz., 6-pack), flavor (cola, fruit-based, root beer). For more details on the model structure and covariates in the model, please see Voleti and Ghosh (2013), Voleti and Sethuraman (2015).

3 Data

We employ a syndicated multi-retailer dataset on the Carbonated Soft Drinks (henceforth, CSD) category containing sales data aggregated to the retail chain level. The data are monthly (four weeks) scanner data at the SKU level from AC Nielsen for five mid-size US grocery retail chains over two years (2005-06). The dataset comprises of 18 brands including 13 national brands and 5 store brands (corresponding to the five retail chains), 424 SKUs and 24,260 observations that account for over 90% of the CSD category sales in these retail chains.

The dependent variable, $Sales_{ijt}$, is the product volume in fluid ounces sold of SKU j in retailer r during period t as recorded by AC Nielsen. $Price_{ijt}$ is measured for each SKU in each month in a retailer as the average price per ounce paid. It is obtained by dividing total revenue for SKU j in retailer r at time t by the volume in ounces of j in rt . That is $Price_{ijt} = Revenue_{ijt}/Volume_{ijt}$. Temporary price reduction ($Pricered_{ijt}$) is captured uniquely in this data set, and is appropriate for retail chain level analysis. It is measured by the \$ Million All Commodity Volume (ACV) of the stores in that chain (r) in which the temporary price reduction has occurred for SKU j any time during period t . For example, assume there are three stores –A, B and C, for Chain r each with store all commodity volume (total sales in \$Million) as Store A (100), Store B (200) and Store C (300). Then, if the particular SKU (j) in period (t) was temporarily price promoted in Store A only, then $Pricered_{ijt} = 100$; if promoted in store A and B, then $Pricered_{ijt} = 300$, and so on. Thus it is an aggregate measure of the incidence of price promotion across stores in a chain for a particular SKU, normalized by the store size. Display/Feature promotion variable is operationalized the same way as Temporary Price Reduction. It is measured by the \$ Million All Commodity Volume (ACV) of the stores in that chain (r) in which Display or Feature has occurred for SKU j any time during period t . Thus, this measure covers the extent of pervasiveness of display/feature promotions.

4 Results

Model (1) was estimated using mixture of normal distribution of parameters using Bayesian methods on the popular R computing platform (R Development Core team 2004) – see Voleti and Sethuraman (2015) for more details. Results are presented in Table 1. Key results and their implications are discussed below.

Are national brands more temporary price reduction (TPR) elastic than store brands? In this research, we estimated own TPR elasticity as the percent change in monthly volume sales for 1% change in incidence of TPR promotions as

measured by the ACV of stores in which the TPR was implemented. Own TPR incidence elasticities are generally small and range from 0.00 to 0.018 (Table 1). They are all positive (as expected) and 64% are significantly different from zero. We do not have estimates from the literature to directly compare this incidence elasticity measure.

Across all retailers and subcategories, average national brand TPR elasticity and store brand TPR elasticity are both 0.011. We also performed pair-wise comparison within each flavor to see whether the TPR elasticity of national brands in a flavor subcategory of CSD is significantly higher than the TPR elasticity of store brand in that subcategory, as would be expected. We find that TPR elasticity is higher for national brands than for store brands in 3/48 NB-SB comparisons, lower for national brands than for store brands in 5/48 NB-SB comparisons and the two are not significantly different in the remaining 40/48 comparisons. Thus, there is no evidence on aggregate that TPR incidence elasticities are higher for national brands than for private labels.

Brand	Temporary Price Reduction Elasticity					Display/Feature Elasticity				
	Ret A	Ret B	Ret C	Ret D	Ret E	Ret A	Ret B	Ret C	Ret D	Ret E
Coca Cola	.015	.012	.000	.015	.012	.094*	.091*	.052	.096 *	.101*
Dr.Pepper	.016	.017	.004	.013	.015	.047	.093*	.048	.048	.048
Pepsi	.013	.015	.012	.013	.011	.05	.095*	.05	.094*	.103*
Store brand	.013	.013	.005	.001	.014	.047	.047	.047	.049	.048
Canada Dry	.015	.013	.003	.004	.014	.047^	.047	.049	.048	.048
Store brand	.014	.013	.014	.001	.014	.094	.048	.047	.049	.047
Fanta	.003^	.013	.013	.013	.013	.048^	.096	.048	.048	.048
Fresca	.015	.014	.014	.014	.014	.094	.095	.048	.047	.048
Store brand	.013	NA	.013	.013	.012	.093	NA	.046	.049	.045
SevenUp	.015	.014	.003	.003	.003	.047	.097	.05	.049	.049
Mountain Dew	.013	.014	.013	.012	.000	.048	.049	.048	.051	.048
Sprite	.004^	.014	.003^	.018	.003	.046	.049	.049	.095*	.046
Sierra Mist	.003^	.001	.015	.002^	.004	.049	.045	.048	.048	.046
Store brand	.013	NA	.014	.012	NA	.095	NA	.045	.041	NA
A&W	.010	.014	.013*	.014	.003	.048^	.048	.048	.081	.047
Barqs	.014	.013	.013*	.013	.014	.095	.048	.047	.048	.094
Mug	NA	.014	.014*	.013	.014	NA	.097	.096*	.048	.095
Store brand	.013	NA	.001	.012	NA	.095	NA	.046	.049	NA

* = NB elasticity > SB elasticity; ^ = NB elasticity < SB elasticity

Table 1: Response Elasticities by Brands and Retailers

Across all retailers and subcategories, average national brand DF elasticity is 0.062 and average store brand price elasticity is 0.055 and the means are not significantly different. This inference is supported by the finding that national brand DF elasticities are greater than corresponding store brand DF elasticities in

10/48 NB-SB comparisons, lower in 7/48 comparisons, and is not significantly different in the remaining 31/48 comparisons.

Delving deeper into the patterns of DF elasticities across brands, subcategories, and retailers (Table 1) provides some additional insights. Many national brands in the cola subcategory, the largest subcategory in the CSD category with over 60% market share, have higher DF elasticity than that of private labels, as expected. In particular, average absolute national brand DF elasticity in the cola subcategory is .074, which is higher than the average store brand DF elasticity of .048, though the difference is not statistically significant because of small sample size and large variance. Furthermore, DF elasticity is higher for national brands than for store brands in the cola subcategory in 8/15 cases and lower in none. Within the cola subcategory, leading brand Coca Cola has significantly higher DF elasticity than store brands in four of five retail chains (Table 1)

For the noncola subcategory, however, results are slightly in the opposite direction. Though the average DF elasticity for both national and store brands are about the same (.058 and .056), DF elasticity is higher for national brands than for store brands in the non-cola subcategory in just 2/33 but lower in 7/33 cases (Table 1).

5 Discussion

The answer to the question of whether national brands are more TPR elastic than store brands, based on sample of 48 national brand – store brand paired comparisons is: 6% (Yes), 10% (no- goes the other way), 84% (no difference). Note that our measure of TPR is based on incidence. That is, if an average national brand and store brand in CSD currently price promote through stores that sell \$100 Million ACV and if they increase temporary price reduction to more stores that account for \$1 million ACV, then both brands would gain 0.011% of total brand unit sales. In other words, if the retailer engages in temporary price reduction of its store brand, then it need not expect any less (or any more!) volume sales increase in percent terms than an average national brand.

Does this finding contradict the asymmetric price-tier effect theory (Blattberg and Wisniewski 1989)? It depends on how the asymmetric price tier effect theory is interpreted. The theory states that when the high-price tier, high quality national brands price promote, they take sales away from store brands or private labels; but, when the lower price tier store brands price promote, they do not take sales away from national brands. While this postulate has received theoretical and empirical support (Allenby and Rossi 1991; Sethuraman 1995), others have questioned its validity on the grounds of price-quality positioning (Bronnenberg and Wathieu 1996) and scale effects (Sethuraman, Srinivasan and Kim 1999). Furthermore, the theory relates only to brand switching and cross-price effects while our finding relates to own price elasticity which includes brand switching, increased purchase by own brand consumers and category expansion through new consumers purchasing the category. In other words, if the theory is interpreted to mean that store brand temporary price reduction is a waste since it would not increase its sales by much, our result contradicts that interpretation and shows that in percent terms both national brands and store brands yield same sales increase. Our results do not speak to other interpretations of the theory.

Does our result therefore suggest that it is equally profitable to price promote store brand as it is the national brands? No, our result only suggests that TPR incidence leads to similar percent unit sales increase. Profitability analysis should incorporate source of sales increase (switchers, loyal consumers), depth of price

cut, unit margins etc. It is, however, noteworthy that in many grocery categories, store brands are price promoted as often as or more often than national brands.

The answer to the question of whether national brands are more DF elastic than store brands, based on sample of 48 national brand – store brand paired comparisons is: 21% (Yes), 14% (no- goes the other way), 65% (no difference). The results are similar to that of TPR elasticity in some ways.

First, DF elasticities have to be interpreted as incidence elasticities in the same way as TPR elasticities. That is, if an average national brand and store brand currently display/feature through stores that sell \$100 Million ACV and if they increase display/feature to more stores that account for \$1 million ACV, then national brands would incrementally gain 0.062% of total brand sales, while store brands would gain 0.055% of unit sales. Thus the very act (incidence) of engaging in retail promotion (TPR or DF) in equivalent stores is unlikely to result in greater sales, on aggregate, for national brand over store brand, as traditional view would suggest.

However, nuanced differences do exist in DF elasticities. In the cola subcategory of CSD, in over 50% of the cases, the traditional view of national brands is validated and in no case is the reverse true. Cola is the largest and most salient subcategory in CSD. The key players are well-known brands such as Coca Cola and Pepsi. These companies invest heavily in their brands and, it is possible that when these brands are displayed or featured they may draw more sales than the store brands. The broad implication would be that manufacturers and retailers, who wish to increase category sales may find it in their interest to display/feature the national brands more in the cola subcategory.

Going further to the brand level, within the cola subcategory, leading brand coca-cola conforms to the traditional view of higher DF elasticity in four of five retailers. Extending the previous argument, Coca Cola is a reputed brand and its salience may be reflected in the higher DF elasticities.

6 Conclusion

In this research, we test whether national brands are more temporary price reduction and display/feature elastic than store brands. Based on our study of the Carbonated Soft Drinks category using a multi-retailer, multi-subcategory data set, we find that in general, there are no difference between national brand effects and store brand effects in terms of TPR and DF elasticities. However, display/feature elasticities are higher for leading national brands in popular subcategories where brand investments are generally high.

These results lead to several managerial implications. More broadly, managers and researchers can estimate and monitor promotional elasticities and see if traditional national brand properties are exhibited. If so, and this is likely to occur in salient subcategories with heavy national brand investments, both retailers and manufacturer can leverage the national brand strength to increase their respective profits. If not, and this is likely in less salient subcategories with smaller national brand investments, both manufacturers and retailers should understand the nature of competition and set their retail promotions accordingly.

There are many limitations and directions for future research. While we have analyzed data across subcategories and retailers, our analysis is based on one category – Carbonated Soft Drinks. We chose this category because brand investments are high and there are many subcategories and SKUs within brands

that allows us to robustly estimate brand-level parameters. Future research can extend to other categories. We have also used a unique data set that provides promotion measures based on promotion incidence at the national retail chain level. Future research can test the results on other data sets, alternate models, and use other measures of response elasticities. In the process, future research can also identify brand and retailer characteristics in which national brands behave according to traditional view and where they do not.

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