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Are Lower-Income Shoppers as Price Sensitive as Higher-Income Ones?: A Look at Breakfast Cereals

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Scanner data for breakfast cereals are used to estimate demand elasticities for six supermarket stores in two distinct socioeconomic areas. Three stores are in low-income locations and three are in high-income locations. A time series cross-section model is estimated for five product categories across six cross sections over forty-two weeks. Results show lower-income shoppers to have more elastic demands for four of the five product categories: private label cold cereals, the top ten brands of cold cereals, all other brands of cold cereals, and hot cereals. Price is not statistically significant for a fifth product category, snack cereals.

Introduction

Several studies have addressed the issue of whether lower-income shoppers face food prices which are higher than those faced by higher-income shoppers (Kunrether; MacDonald and Nelson; Narasimhan; and Gerstner and Hess). Most frequently, these studies have looked across fixed market baskets and focused on factors such as store location, size, and type. Invariably these studies have concluded that prices in central city stores are higher than those in suburban stores; prices in smaller stores are higher than those in larger stores; and prices in independent stores are higher than those in chain stores.[1] Such price differentials have a pronounced effect on lower-income shoppers because a disproportionate number of lower-income people reside in central cities with large numbers of small and independent stores. Factors in these price differentials include differences in operating costs, economies of scale, market power, breadth of products and services, search costs, and demand elasticities.

While the aforementioned studies are quite informative regarding price differences by store size, type and location, they are not very informative about the behavior of different socioeconomic groups of shoppers facing the same set of prices. This study extends the research methodology on consumer shopping behavior by addressing the issue of whether, when confronted with uniform prices, lower-income shoppers show higher, lower, or similar price elasticities of demand. More specifically, this study provides estimates of price elasticities for two distinct socioeconomic areas: one consisting of three stores in lower-income locations, and the other consisting of three stores in higher-income locations. All stores are in a single price zone.[2] While there are distinct differences in income, education and other socioeconomic factors by store location (Table 1), the supermarket chain providing the data for this study has not used these differences to develop a store-specific pricing strategy. Instead, the chain has employed zone pricing as its competitive strategy. Since consumers are known to shop within a narrowly defined geographic area, it seems plausible to characterize shoppers according to the socioeconomic factors surrounding a given store location (Cox and Foster).

Cereals are the focus of this study because of their high economic value ($7.7 billion in 1991) and their widespread use among households (Gibson; Weinstein). During the past twenty years, per capita consumption of breakfast cereals has risen by 45 percent, climbing from 10.3 pounds in 1970 to 15.0 pounds in 1991. The development of health-oriented bran and oats-based cereals coupled with high levels of promotion are factors which have helped to spur this growth in consumption (Best; Turcsik). Manufacturers issue coupons which are redeemed for up to 50 percent of cereal sales, and they offer extensive trade deals to retailers (McCallum). Additionally, considerable promotion is done through media advertising. From 1975 to 1990, the advertising-sales ratio for cold cereals increased from 7.2 percent to 13.1 percent (LNA/Arbitron). These factors speak to the economic value of cereals and they help to define the research importance of cereal products.

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Table 1. Socioeconomic Characteristics of Two Socioeconomic Areas

	Census-Tract Data							Weekly Store-Level Data				
		Race				*Education*						
Store Location	Population	White	Other	Median Age	Average Family Income	High School	College	Average Store Sales	Sales Per Sq. Feet	Average Cereal Sales	Average Customer Count	Average Consumer Purchase
		(Percent)				*(Percent)*						
Higher Income												
Store 1	4,487	96	4	43.0	$70,641	41	55	$387,821	$6.34	$13,313	18,827	$20.56
Store 2	11,199	96	4	32.2	$56,031	47	45	$346,956	$8.23	$10,635	16,813	$20.62
Store 3	3,539	96	4	33.0	$50,712	55	36	$545,943	$9.72	$19,488	22,986	$23.78
Average	9,742	96	4	36.1	$59,128	48	45	$426,906	$8.10	$14,465	19,542	$21.65
Lower Income												
Store 4	7,754	89	11	32.8	$27,689	58	7	$403,649	$6.85	$10,873	19,163	$20.99
Store 5	6,582	95	5	33.2	$27,301	50	3	$324,082	$9.58	$10,151	13,759	$23.55
Store 6	4,682	84	16	32.3	$27,433	59	7	$386,910	$9.18	$10,562	23,696	$16.28
Average	6,399	89	11	32.8	$27,474	55	6	$355,496	$8.54	$10,356	18,728	$20.27

Sources: Bureau of the Census, 1990 Census of Population and Housing: Census Tracts Data on CD-Rom. Columbus, Ohio Standard Metropolitan Statistical Area, U.S. Department of Commerce, July, 1992; and A National Supermarket Chain Store.

Demographic and Income Information by Store Locations

Important demographic and income data for six stores selected from the Columbus (Ohio) metropolitan area are shown in Table 1. This table represents a combination of 1990 census data and store-level data by location. Census tract data are used to characterize store locations because the supermarket chain could not provide its market studies for store locations. Besides, the most detailed market studies conducted by the chain occurred during the decision-making periods for store locations. Recently released census data are far the most current and comprehensive.

Stores 1, 2 and 3 are located in higher-income suburban areas, but within close proximity of the central city of Columbus. The farthest distance between any two of the six stores is roughly 15 miles, or approximately 25 minutes of travel time by car. Average family income in the higher-income areas is more than twice that in lower-income areas. Store sales in the higher-income area average about 13 percent above those for the lower-income area. Cereal sales, as a percentage of store sales, are also highest for the higher-income areas. For all stores, cereal sales average just above three percent of store sales. Store-level data reflect the period of February 4, 1990 through February 16, 1991. However, cereal sales were unavailable for one of the six stores during the 12 weeks betweem July 22, 1990 and October 20, 1990. Forty-two weeks of comparable observations across all stores were available.

As shown in Table 1, store five of the lower-income stores would appear to be a higher-income store based on average consumer purchases. However, census data confirm that this store is located in a lower-income area and the unusually high purchases per customer is undoubtedly due to its urban/rural base. That is, the store is located on the fringe of a rural community, and it draws shoppers from both urban and rural areas. High purchases per customer for this store, compared to the other lower-income stores, suggest that rural residents make fewer shopping trips and larger purchases per trip than their urban counterparts.

A very pronounced educational disparity is revealed for the two-income areas. Given the supposedly positive relationship between income/education and coupon redemption, it might be postulated that stores in the higher-income areas are likely to receive a greater proportion of coupons than their lower-income counterparts (Bawa and Shoemaker; Levedahl; Nielsen). Moreover, the mix of products purchased should vary considerable among the stores within the two-income areas if coupon availability reflects the purchasing preferences of higher-income, higher-educated consumers.

Data Description

A national supermarket chain with significant market shares in the Columbus metropolitan area (more than 25%) provided the cereal scanning data for this study. Each store carried approximately 175 different cereal products, or an average of 455 products when enumerated by brands, sizes and flavors. Weekly observations ran from Sunday through Saturday. No advertising expenditures were available, but the data did include a code indicating whether a product was promoted during a given week. This accounted for media advertising, merchandising, price reductions, or some combination of two or more of these activities.

With 42 weeks of usable data on an average of 455 products per store, approximately 19,110 data entries are available per store. To make these data entries manageable, cereal products are classified into product groups. Five product groups are identified: 1) private label cold cereals; 2) top ten brands of cold cereals; 3) all other brands of cold cereals (OBRD); 4) instant hot cereals; and 5) snack-related cereals. The top ten brands represent those brands with the highest market shares as measured by dollar sales for 1989. For example, Cheerios was the leading brand with a market share of 4.8 percent; Kellogg's Frosted Flakes was second with a market share of 4.6 percent; etc. It should be emphasized that Chex cereals, the seventh leading brand in 1989, includes many product varieties: Bran Chex, Corn Chex, Rice Chex, etc. Under the delineated classification system, product distributions for the five groups are 4.0, 10.5, 38.0, 16.2 and 31.2 percent respectively. That is, private label cereals constituted 4.0 percent of cereal items sold, or roughly 758 of the 19,110 items sold. This classification system, however, should not be confused with expenditures per product category or quantities (measured in ounces) per product category.

Model Development and Estimation Procedures

Because this research focuses on the measurement of price elasticities for higher and lower-income shoppers with respect to space and time, a time series cross-section model is the most appropriate (Pindyck and Rubinfeld). Alternative model specifications are possible, but the error components model has been shown to be the most robust (Fuller and Battese). The general form of this model is:

$$(1) \quad Y_{qr} = \sum_{s=1}^{V} X_{qrs} B_s + u_{qr},$$
$$q = 1,2,\ldots,N;\ r = 1,2,\ldots,T$$

where N is the number of cross sections, and T is the length of the time series for each cross section.

Six cross sections and 42 observations per cross section are included in the specified model for this study. Five equations are specified and estimated using the time series cross-section regression (TSCSREG) procedure in SAS. The equations and included variables are specified as follows:

$$(2) \quad Q_{ikt} = f(P_{ikt}, P_{jkt}\text{'s}, P_{mkt}, SDUM_{kt}, HOL, PAY, TEXP_{kt}, PROM_{ikt}, GRW_{kt}, Q_{ikt-1}),$$

where Q_{ikt} is total ounces of product group i for store k in week t, i = 1,...,5, k = 1,...,6, t = 1,...,42; P_{ikt} is a weighted-average price of product group i for store k in week t; P_{jkt}'s represent weighted-average prices for competing product groups for store k in week t; P_{mkt} is identical to P_{ikt} for lower-income stores 3, 4, and 5, but 0 for all other stores (which is intended to capture price elasticity differences for higher and lower-income stores); $SDUM_{kt}$'s are zero-one dummy variables intended to capture store differences; HOL is a zero-one variable for calendar holidays; PAY is a zero-one variable measuring nearness to payday (PAY = 1 for weeks including the 1st or 15th of each month; 0 otherwise); $TEXP_{kt}$ represents total expenditures on cereal products for store k in week t (intended as a proxy for consumer income); $PROM_{ikt}$ reflects the number of promoted products within group i for store k during week t; GRW_{kt} is a trend variable for store k expressed from 1 to 42, intended to capture growth of cereal sales; and Q_{ikt-1} is total ounces of product group i purchased in store k during the previous week. Descriptive statistics for prices, expenditures and promotions are provided in Table 2.

Prices are determined by expressing each product sale as a ratio of all product sales within a given product group. Specifically, weighted price for product group i in each time period is:

$$(3) \quad P_i = \sum_j W_{ij} P_{ij}, \text{ where } W_{ij} = (P_{ij}\, Q_{ij})/(\sum_j P_{ij}\, Q_{ij})$$

and j denotes the products in the same group. Because each product group is a potential substitute for or complement with other product groups, all product groups are included in each equation. Because of 12 weeks of missing observations in the middle of the data set, the first observation immediately following the missing time period (twenty fifth observation) is omitted to properly align current and lagged values of the dependent variables.

Because price elasticities of demand are the primary focus of this analysis, each equation is specified in its double logarithmic functional form to give direct demand elasticities. Since previous studies have indicated a link between demographics and cereal sales, it is hypothesized that cold cereal products will show more price sensitivity in lower-income stores that these same products show in higher-income stores (Bawa and Shoemaker; Wolfe). That is, demand for cold cereals is likely to be more price inelastic in higher-income areas than it is in lower-income areas. Further, it is hypothesized that stores in lower-income areas will show a stronger propensity toward the consumption of private label and hot cereals than stores in higher-income areas. With many of the health-related bran and oats-based cereals included in the "other brands" category, it is hypothesized that higher-income areas will show a stronger propensity toward the consumption of these products.

Empirical Results

Tables 3, 4 and 5 provide the estimated results for the five categories of breakfast cereals. Although price elasticity differences are the focus of this analysis, results are shown for all variables. Statistically significant results are shown for most variables in four of the five equations, with the snack cereal equation being an exception. Statistically significant differences are found among the stores and own price is shown to have a negative and statistically significant impact on quantity purchased for all cereal categories except snack cereals. This latter category of cereals, consisting of products such as Nutri-Grain Bars, Granola Bars, Fruit Rollups, etc., is likely to reflect impulse buying.

With respect to price elasticity differences for higher- and lower-income shoppers, Table 3 shows lower-income shoppers to have a price elasticity of demand for private label cereals more than twice that of higher-income shoppers (-1.55 versus -.59). Considerable confidence can be placed in this price elasticity difference for higher- and lower-income shoppers because the parameter estimate is statistically significant at the .01 level. These elasticity differences suggest that private label cereals undoubtedly represent a large enough proportion of lower-income shoppers' total cereal purchases to make them quite cognizant of price changes. Indeed careful analyses of the data show that private label cereals constitute 4.12 percent of cereal sales in lower-income stores as compared to 2.09 percent in higher-income stores. These higher expenditure proportions for lower-income shoppers challenge some researchers' argument that poorer

Table 2. Descriptive Means of Relevant Variables

	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6	ALL Stores
Dependent variables[a]				(Mean Values)			
Private label	1387	1955	3220	3254	3081	3342	2706
Top ten brands	19663	16031	28641	18017	18003	19044	19900
Other brands	31240	23264	44648	24216	21105	22028	27750
Instant cereals	7117	5423	8897	6598	7135	8370	7256
Snack cereals	8214	8236	13676	6596	6536	5484	8124
Price variables[b]							
Private label	2.07	2.18	2.22	2.18	2.19	2.08	2.15
Top ten brands	3.13	3.12	3.21	3.05	3.03	3.04	3.09
Other brands	3.30	3.31	3.35	3.31	3.29	3.29	3.31
Instant cereals	2.72	2.67	2.71	2.51	2.49	2.36	2.58
Snack cereals	2.27	2.26	2.27	2.25	2.24	2.21	2.25
Promotion variables[c]							
Private label	2.14	2.14	2.48	2.19	2.14	2.19	2.25
Top ten brands	5.52	5.43	6.37	5.45	5.40	5.59	5.75
Other brands	15.59	15.35	17.48	15.47	15.50	15.64	16.32
Instant cereals	6.90	7.02	8.57	6.93	6.93	6.86	7.43
Snack cereals	13.71	15.11	17.00	14.64	14.95	15.09	15.45
Category sales[d]							
Private label	188	270	449	434	425	437	367
Top ten brands	3563	2869	5153	3094	3052	3246	3496
Other brands	6615	4949	9502	5216	4528	4737	5924
Instant cereals	1018	777	1252	858	909	1097	985
Snack cereals	1928	1767	3052	1270	1237	1045	1716
Total expenditures[e]							
Private label	13.65	13.88	13.99	13.51	13.86	13.21	13.68
Top ten brands	18.13	17.94	18.18	17.31	17.04	17.09	17.62
Other brands	21.19	21.35	21.37	21.61	21.55	21.53	21.43
Instant cereals	14.52	14.73	14.15	13.18	12.86	13.12	13.76
Snack cereals	23.46	21.49	22.39	19.32	19.04	19.10	20.80
Other variables							
Customers[f]	18827	16812	22985	19163	13759	23696	19207

[a] Ounces per week; [b] Dollars per box of cereal; [c] Number of products promoted;
[d] Dollar sales per week; [e] Cents paid per ounce of cereal; [f] Number of customers.

Table 3. Empirical Results for Time Series Cross-Section Regression: Private Label and The Top Ten Brands

Private Label Cereals

Variable	Parameter Estimate	Standard Error	T-Ratio
Price Variables			
Private Label A@	-0.5963**	0.2748	-2.1696
Private Label B&	-0.9498*	0.3224	-2.9461
Top Ten Brands	0.5646	0.4026	1.4024
Other Brands	3.0815*	0.5738	5.3700
Instant Cereals	-0.1532	0.2208	-0.6936
Store Variables			
Store 2	0.5455*	0.0392	13.9260
Store 3	0.5068*	0.0458	11.0672
Store 4	1.7615*	0.2477	7.1099
Store 5	1.8123*	0.2487	7.2871
Store 6	1.7647*	0.2403	7.3452
Other Variables			
Promotion Plab	-0.0004	0.0051	-0.0730
Payday	0.0141	0.0320	0.4422
Holiday	0.0566	0.0437	1.2943
Lagged Quantity Plab	0.0226	0.0142	1.5897
Growth	-0.0448	0.0304	-1.4740
Cereal Expenditures	0.8184*	0.0830	9.8648
Constant	1.3076**	0.7088	1.8448

Top Ten Brands

Price Variables			
Top Ten Brands A@	-0.6996*	0.2454	-2.8507
Top Ten Brands B&	-0.6698*	0.1568	-4.2712
Private Label	-0.0166	0.1131	-0.1471
Other Brands	-0.1011	0.3814	-0.2650
Instant Cereals	0.0134	0.1166	0.1152
Store Variables			
Store 2	-0.0063	0.0181	-0.3461
Store 3	0.0428**	0.0219	1.9583
Store 4	0.8172*	0.1818	4.4940
Store 5	0.8738*	0.1823	4.7946
Store 6	0.9033*	0.1823	4.9543
Other Variables			
Promotion Tten	-0.0016	0.0017	-0.9409
Payday	0.0396	0.0324	1.2220
Holiday	-0.0193	0.0432	-0.4471
Lagged Quantity Tten	-0.0014	0.0112	-0.1246
Growth	0.0403	0.0274	1.4702
Cereal Expenditures	0.9213*	0.0446	20.6423
Constant	8.3033*	0.5137	16.1633

@ Indicates the price elasticity estimate for all stores.
& Indicates the difference between the price elasticity for lower income stores and all stores.
* Indicates statistical significance at the .01 level.
** Indicates statistical significance at the .10 level.

shoppers are more inclined to purchase established brands because they have more to lose from making a mistake on unknown or little known brands.

For the top ten brands of cold cereals, lower-income shoppers are shown to have a price elasticity of demand which is almost twice the magnitude of that for higher-income shoppers. Indeed, just as indicated for private label cereals, lower-income shoppers are shown to have an elastic demand for the top ten brands of cereals while higher-income shoppers are shown to have an inelastic demand. This finding is particularly revealing because it shows a differential response even when there is no reasonable substitute for the product category in question, as is the case for the top ten brands. It suggests that lower-income shoppers are price selective both within and among product categories.

The own price elasticity for the reasonably large class of other brands of cereals shows, consistent with consumer demand theory, a more elastic demand for both higher- and lower-income shoppers. Higher-income shoppers are shown to have an elastic demand for these products, but lower-income shoppers are shown to be even more price sensitive. These elasticity differences clearly support the notion that price is a relevant factor in guiding consumer buying decisions. Also, because many of the higher-priced products are within this product category and there are a disproportionate number of coupons issued for higher-priced products, these elasticities support the argument advanced by Bawa and Shoemaker that coupon-prone consumers are less likely to be brand loyal.

As shown in Table 4, instant cereals show a more elastic demand than any other cereal category. Yet, despite the highly elastic demand shown for higher-income shoppers, lower-income shoppers are shown to be even more price sensitive. Again, these estimates are consistent with consumer demand theory which emphasizes the importance of income and prices in guiding consumption decisions. The higher price elasticities of demand for this product category, relative to snack and cold cereals, could reflect the role of convenience in influencing consumption decisions. Hot cereals generally require some preparation time, thereby are perceived as less convenient than cold cereals. This product attribute deficiency of hot cereals undoubtedly weakens the preference function of all consumers, but the price elasticity estimates show that lower-income consumers have a preference function more sensitive to product prices for this cereal category.

As shown in Table 5, own price is not a statistically significant determinant of snack cereal purchases. As a snack product, it is likely that impulse plays a larger role than price in determining consumer purchases. Moreover, many of the items included in this product category, such as Nutri-Grain Bars, Granola Bars and Fruit Rollups, are not exclusively breakfast products. Therefore, they are likely to represent just one of a variety of snacks competing for a share of the consumer snack dollar. Despite the insignificance of price as a determinant of consumer snack cereal purchases, Table 2 shows that lower-income consumers purchase the lower-priced products within this product category (unit purchase price averages 19.15 cents per ounce for lower-income shoppers as compared to 22.45 cents for higher-income ones). Additionally, careful analysis of the data shows that lower-income shoppers spend a relatively smaller proportion of their cereal expenditures on snack cereals. During the 42 weeks of this study period, snack cereals represented an average of 11.21 percent of total cereal expenditures for lower-income shoppers, compared to 15.55 percent for higher-income shoppers.

Summary and Conclusion

The objective of this study was to determine if higher- and lower-income shoppers display similar or dissimilar price elasticities of demand for breakfast cereals when confronted with uniform prices. To accomplish this objective, a time series cross-section model was specified and estimated for five product categories across six cross sections and over 42 time periods (weeks). The results showed lower-income shoppers to have more elastic demands for four of five product categories: private label cold cereals; the top ten brands of cold cereals; other brands of cold cereals; and hot cereals. Price was shown to be statistically insignificant for a fifth product category, snack cereals.

The findings of this study suggest that lower-income shoppers make rational purchase decisions as defined by consumer demand theory. That is, purchases for lower-income shoppers are guided by their income and product prices. With private label cereals, the findings do not support the argument advanced by some researchers that lower-income shoppers, because of their desire to minimize risk, are reluctant to purchase lesser-known brands. These findings would suggest that lower-income shoppers either find similar quality attributes across national and private label brands or they find the price differential to be of sufficient magnitude to more than compensate for any quality differences.

The findings for this study also show that lower-income shoppers not only have higher price elasticities across product categories, but they tend to purchase the lowest-priced products within a given product category. For example, within the top ten brands of cold cereals, lower-income shoppers paid an average of 17.15 cents

Table 4. Empirical Results for Time Series Cross-Section Regression: Other Brands and Instant Cereals.

Other Brands

Variable	Parameter Estimate	Standard Error	T-Ratio
Price Variables			
Other Brands A@	-1.4850*	0.2855	-5.2011
Other Brands B&	-0.2440**	0.1201	-2.0309
Private Label	0.0979	0.0740	1.3220
Top Ten Brands	0.0153	0.1428	0.1070
Instant Cereal	0.1391**	0.0751	1.8515
Store Variables			
Store 2	-0.0620*	0.0115	-5.3957
Store 3	-0.0169	0.0138	-1.2270
Store 4	0.2532**	0.1467	1.7263
Store 5	0.1759	0.1471	1.1959
Store 6	0.1928	0.1468	1.3130
Other Variables			
Promotion Obrd	-0.0006	0.0005	-1.2621
Payday	-0.0441**	0.0237	-1.8614
Holiday	0.0040	0.0313	0.1271
Lagged Quantity Obrd	0.0117	0.0077	1.5200
Growth	-0.0179	0.0193	-0.9262
Cereal Expenditures	1.0097*	0.0281	35.8934
Constant	9.2472*	0.3583	25.8063

Instant Cereals

Price Variables			
Instant Cereals A@	-2.3616*	0.2249	-10.5024
Instant Cereals B&	-0.4692**	0.2490	-1.8840
Private Label	-1.0871*	0.2239	-4.8555
Top Ten Brands	0.0251	0.3779	0.0665
Other Brands	2.8873*	0.6366	4.5355
Store Variables			
Store 2	-0.0376	0.0402	-0.9350
Store 3	-0.1301*	0.0448	-2.9058
Store 4	0.3847	0.2392	1.6083
Store 5	0.5935*	0.2370	2.5040
Store 6	0.5142**	0.2289	2.2464
Other Variables			
Promotion Inst	0.0052*	0.0018	2.9233
Payday	-0.0438	0.0360	-1.2164
Holiday	0.0379	0.0512	0.7392
Lagged Quantity Inst	0.0051	0.0151	0.3400
Growth	-0.0019	0.0394	-0.0477
Cereal Expenditures	1.0978*	0.0881	12.4634
Constant	5.5507*	0.7937	6.9938

@ Indicates the price elasticity estimate for all stores.
& Indicates the difference between the price elasticity for lower income stores and all stores.
* Indicates statistical significance at the .01 level.
** Indicates statistical significance at the .10 level.

Table 5. Empirical Results for Time Series Cross-Section Regression: Snack Cereals.

Snack Cereals

Variable	Parameter Estimate	Standard Error	T-Ratio
Price Variables			
Snack Cereal A@	-0.1941	0.2856	-0.6796
Snack Cereal B&	-0.1747	0.2205	-0.7919
Private Label	0.0426	0.1352	0.3149
Top Ten Brands	0.0133	0.2557	0.0519
Other Brands	-0.1710	0.4344	-0.3937
Instant Cereals	0.0933	0.1344	0.6946
Store Variables			
Store 2	0.2555*	0.0205	12.4365
Store 3	0.0493**	0.0259	1.9023
Store 4	0.1570	0.1875	0.8373
Store 5	0.2238	0.1886	1.1868
Store 6	0.0057	0.1870	0.0307
Other Variables			
Promotion Bsnk	0.0018**	0.0008	2.2085
Payday	-0.0392	0.0340	-1.1538
Holiday	-0.0783**	0.0450	-1.7381
Lagged Quantity Bsnk	0.0257**	0.0127	2.0330
Growth	-0.0535**	0.0294	-1.8206
Cereal Expenditures	1.1507*	0.0504	22.8157
Constant	6.1863*	0.5865	10.5481

@ Indicates the price elasticity estimate for all stores.

& Indicates the difference between the price elasticity for lower income stores and all stores.

* Indicates statistical significance at the .01 level.

** Indicates statistical significance at the .10 level.

per ounce of purchase as compared to 18.08 cents per ounce for higher-income shoppers. Additionally, even though price is not a statistically significant determinant of product purchases for snack cereals, lower-income shoppers paid an average of 19.15 cents per ounce as compared to 22.45 cents per ounce for higher-income shoppers. In sum, lower-income shoppers are shown to be quite rational, showing higher price elasticities of demand and purchasing the least expensive products within a given product category.

Endnotes

1. Cotterill found independent grocery stores to have higher prices than supermarket chain stores. However, within central cities, MacDonald and Nelson found statistically insignificant price differences for independents and chains.

2. Zone pricing is a type of geographic pricing in which all buyers within a given geographic area face uniform prices.

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