PRODUCT QUALITY AND VALUE FOR PROCESSED FOODS

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This study investigates quality and value comparisons between national and private label brands of processed food products. Regression analyses indicate a weak relationship between price and quality for such products. Private label and national brands offer similar product quality while private labels offer better values for consumers.

Product Quality and Value for Processed Foods

Food manufacturers and merchandisers use various marketing strategies to position their products to compete effectively for the consumer food dollar. One common strategy is the branding of food products. Food manufacturers may label products with their brands, or with reseller brands (private labels). For a branding strategy to be effective, the firm must be able to differentiate its product from those of its rivals and to communicate these differences to consumers. As a result of these communications, consumers develop brand loyalty for particular products.

A firm will segment a market by selling a mix of products that vary in design, packaging, ingredients, quality, or other product and service attributes. Each product or variation of a product is targeted to a specific group of consumers. This mix of sales is supposed to achieve sales goals and protect the firm from loss of sales to rivals. Although market segmentation strategies increase the variety of food products available to consumers, they can result in a proliferation of products with only minor differences in quality (Connor, and Schmalensee).

For example, double-blind experiments have demonstrated that consumers cannot distinguish premium from popular-priced beer brands, but exhibit definite preferences for the premium brands when labels are affixed (Scherer). One suspects that this may be true for many other products. Wills and Mueller have shown that advertising and other forms of market segmentation permit the seller to charge higher prices than would have been possible under undifferentiated competition. They found

that prices of weakly advertised national brands and private labels were substantially lower than the prices of leading brands, especially highly advertised brands. Furthermore, real quality and cost differences did not appear to account for the price differences across brands. Our objective is to determine whether national brand and private label brand processed food products exhibit differences in quality and value.

In the next section, we analyze the relationship between price, quality, and brand labels. Next, we describe the approach used in this paper to measure product quality and value and our statistical analyses. We then present the results and discuss their implications for merchandisers and consumers.

Price, Quality, and Brands

Studies by Oxenfeldt; Riesz; Wills; Gerstner; and MacDonald, Scheffman, and Whitten have analyzed the price-quality relationship for various processed food products. On average, they found the price-quality relationship for food products to be positive, but relatively weak. Why consumers' experimentation is insufficient to weed out both the bad products and the prestigious, high-priced but objectively mediocre items is important in our understanding of the monopoly power associated with market segmentation.

Consumers are usually imperfectly informed about the market which enables producers to charge noncompetitive prices. Thus the price-quality relationship is weakened. Salop and Stiglitz contend that the reliance of imperfectly informed consumers on price as a quality indicator is completely justifiable if the market contains relatively large numbers of

well-informed consumers. Well-informed consumers 'discipline' the market so that price differences reflect true variation in quality. However, if the proportion of well-informed buyers is small it might be profitable for firms to cut quality, especially when it is difficult for consumers to judge the product's quality (Klein and Leffler, Shapiro).

The problem for the consumer is to evaluate the utility of each brand. When products exhibit a complex vector of attributes the customer is likely to rely on some subset of these characteristics in making relative value decisions (Lesser and Masson). Such a subset of characteristics can be described as a signal or cue. In processed foods, value differences among brands persist because reliable information about some characteristics is unavailable. In most cases, unit prices can be easily compared. But, ingredient shares, nutritional value, naturalness, and brand effectiveness are difficult to evaluate before purchase and may be hard to discern even after using the brand.

Numerous studies have shown that both price and brand name are frequently used as cues to product quality by consumers (Steenkamp). Therefore, sellers who gain from repeat sales have an incentive to invest in product image (brand names) as a cue. At purchase, measurement or verification of product quality for food products is rather costly, if not impossible. Thus the buyers must rely on the seller's assertion of product quality. Also, the seller will try to convince the buyer that the product is quite uniform and will not vary from purchase to purchase.

Lets take as an example a processor who changes the quality of peas (e.g., size, tenderness, sweetness) from one year to another (Barzell).

This will induce buyers to conduct a new and costly sampling of the product every year. If, on the other hand, the canner maintains a tight quality control, much less consumer sampling is required. The canner's reputation, or brand name, serves here to guarantee that the peas are, and will remain, of uniform quality.

However, the canner incurs higher costs in establishing reputation. The result is slightly higher-priced products, but the higher price reflects only this quality differential (Telser). Thus, when the seller's reputation is used to back the product, the consumer expects that quality will fluctuate less. To ensure the buyer's patronage, the canner must persuade the buyer that the firm will suffer a substantial loss if its product is found deficient. By backing the quality of the peas with a brand name, deficient items sold under that name will tarnish the entire brand. Furthermore, the more likely it is for the consumer to purchase the brand in the future (as with processed foods), the greater the incentive for the seller to maintain product quality. Also, the more difficult it is for consumers to determine product quality at purchase, the more extensive would be the use of brand names.

DATA

The data were obtained from *Consumer Reports (CR)*, a magazine published monthly by the Consumers Union (CU) to provide consumers with information and advice on products and services. CU is a non-profit organization established in 1936 to maintain and enhance the quality of life of consumers. The data set consisted of 29 product tests involving 1,079 brands of processed food products published in *CR* over the 17 year

period 1972-1988. The primary data set consisted of the number of brands, unit price, package size, and objective quality ratings. In addition individual product items were identified by the authors as being either national brands or private label brands.

The appropriateness of using product test data to study the strength of price-quality relationships has been discussed by Geistfeld and Maynes. The major strength of *CR* data is CU's reputation, integrity, impartiality, and experience. The major limitation is the extent to which the assessment of the quality attributes reflect what actually exists in the marketplace. Hjorth-Andersen has criticized the use of quality rank order data, because the overall rankings are dependent upon the weights chosen by the experts. However, Curry and Faulds have shown that overall quality scores are affected by the attribute weights used only when: (1) one person's weights are the reverse of another person's weights or (2) attribute ratings are predominantly negatively correlated.

A study by Lichtenstein and Burton indicated that some consumers seemed to evoke the schema across all product categories that "higher prices mean higher quality", whereas others tended to follow the schema that, "prices and quality are unrelated." In general, they found a positive, but not strong, correlation between consumers' perception of the price-quality relationship for nondurable products and objective price-quality relationships such as those used in our study. Over the past 40 years, more than a dozen studies have been published assessing the price-quality relationship using *CR* data (Geistfeld). Therefore, the problems that may arise from informed consumers assessing quality differently than

CU are of limited concern.

The quality variable used in this analysis is the rank of individual brands based on analyses conducted by CU researchers. For each product, the researchers selected a limited array of characteristics they judged to be most important to consumers and weighted those characteristics to obtain an overall evaluation. Attribute weights are assigned by an expert taste panel. The attribute weights are based on a specified criteria for excellence. However, the attribute weights are selected to conform to the tastes of the 'average' consumer. The attribute weights are calculated as weighted additive composites of overall quality ratings measured on a sensory index from 0 to 100. The sensory index is transformed onto a five-point ranking quality scale: poor, fair, good, very good, and excellent. These five-point evaluation scores are reported in *CR*. We used the five-point scores to develop our quality variable by assigning a numeric number from one to five (five corresponding to excellent) to each evaluation score. In cases where more than one evaluation was made for a product, we simply added together all of the evaluation scores.

The quality scores were standardized to a mean of 50 and a standard deviation of 10, so that comparisons could be made between product categories. The formula for the standardization of the quality data was:

$$Quality_{i,j} = 10 \times \frac{Q_{i,j} - Q_j}{QP_j} + 50, \text{ where:}$$

$Quality_{i,j}$ = standardized quality score for brand i in product report j,

$Q_{i,j}$ = quality for brand i in product report j,

Q_j = mean quality for all brands in product report j, and

QP_j = standard deviation of quality in product report j.

The transformation on the quality data is the z-score: $X = 10 (Z) + 50$. The mean and standard deviation are: $E(x) = 10 \times E(Z) + 50 = 10 (0) + 50 = 50$ and $Std = Var(x)^{1/2} = 10^2 Var (Z)^{1/2} = 100(1)^{1/2} = 10$, respectively.

ANALYSES

For each food product, Spearman's rho rank correlation coefficient was computed between quality and price ranking data. Rank order correlation coefficients were used instead of linear correlation coefficients because there is no reason to assume that the relationship between price and quality should be linear (Steenkamp). Research by Klein and Leffler and Shapiro suggested a monotonically increasing but nonlinear price-quality relationship. Since package sizes differed within each product category, price per unit of measure was used as brand price (Gerstner, Riesz). The unit price listed for each product represents the average paid by CU shoppers in the marketplace. The price data were adjusted for inflation using the CPI for food products with 1980 as the base year. Package size was given in ounces.

The quality index provided an opportunity to test the hypothesis that higher prices and national brands signal higher product quality. To test this hypothesis, the following regression equation was estimated.

$$Price = \beta_0 + \beta_1 Quality + \beta_2 Package\ Size + \beta_3 Label + \epsilon$$

where: Price = price per ounce adjusted by the CPI,

Quality = quality index,

Pksize = package size in ounces,

Label = a dummy variable coded 0 for national brand and 1 for

private label brand,

$\beta_0, \beta_1, \beta_2, \beta_3$ = parameters to be estimated, and

ϵ = an error term with mean 0 and variance σ^2.

A priori, we expected the quality coefficient to be positive ($\beta_1 > 0$) and the package size and label coefficients would be negative ($\beta_2 < 0, \beta_3 < 0$). In other words, we expected that higher quality, smaller package sizes, and national brands would be sold for higher unit prices. These variables are especially important because they are visual cues frequently available to the consumer at the point-of-purchase. Although empirical evidence has indicated that consumers seldom use unit-price information, other research indicates that brand-label is an important factor in determining purchase decisions (Walden). The Private Label Manufacturers Associations found that major grocery chains have offered larger package sizes at lower unit prices than those offered by national brands in order to communicate a "value-oriented" image to their customers.

We tested the hypothesis that private label provide greater value than national brands, by computing the following regression.

$$\text{Value} = \beta_0 + \beta_1 \text{ Pksize/Price} + \beta_2 \text{ Label/Price} + \epsilon$$

where: Value = quality index / price per ounce adjusted by the CPI,

Pksize/Price = package size / price per ounce adjusted by the CPI,

Label/Price = a dummy variable coded 1 for national brand, and 2 for private label / price per ounce adjusted by the CPI,

$\beta_0, \beta_1, \beta_2$ = parameters to be estimated, and

ϵ = an error term with mean 0 and variance σ^2.

A priori, we expected both the package size/price coefficient and the

label/price coefficient to be positive ($\beta_1>0$, $\beta_2>0$). In other words, we expected larger package sizes and private label brands would provide better value. We adjusted each coefficient for price differences because there may be other variables, other than quality, which may cause price differences. By dividing through by price we were able to isolate the quality component of value as a function of package size and label.

RESULTS

Table 1 provides a summary of the results of the price-quality correlations. Spearman's rho ranged from -0.61 to 0.80, with a mean of 0.03 and a median of 0.03. Only 21% of these correlations were both positive and significant, and nearly half were negative. The results confirm the near zero correlation between price and quality for packaged food products found by Riesz; MacDonald, Scheffman, and Whitten; Gerstner and other investigators. Low rank correlation reflects informationally imperfect markets, because brands offering a relatively low quality at a relatively high price can only exist if at least some consumers are imperfectly informed. As noted by Riesz, imperfect markets undoubtedly exist because consumers do not possess, nor can they easily obtain, information necessary to make accurate assessments of product quality.

Certainly, the potential rewards for being discriminatory are appreciable. A survey of ten processed food products showed that the price of the most popular nationally advertised brand sold in chain stores was 21.5 percent higher on average than the price of private label items of comparable quality. The price premiums for nationally advertised goods ranged from 4 to 35 percent (Scherer). Wills conducted a similarly

detailed analysis of price differences among brands of food products. The prices of retailers' and wholesalers' private label brands were 17 percent lower than prices of the top selling brand, and prices of generics were 31 percent lower on average.

In Table 2, we report the results of comparisons between national brands and private labels in terms of prices paid by consumer reports personnel, available package sizes, and differences in product quality and value. With the exception of coffee creamers, private labels generally were priced lower than national brands. In fact, private labels sold for an average of 26 percent less than national brands. In addition, private labels of 67 percent of the products we studied were sold in larger, average package sizes.

Private labels of 60 percent of the products appearing in table 2 had lower, average quality rankings; however, a significant difference between average product quality for national brand and private labels occurred for only eight products. Among these, national brands were of better quality for five items: potpies, chocolate chip cookies, instant coffee, macaroni & cheese, and chili. Private label brands were judged to be of higher, average quality for stuffing mixes, cottage cheese, and ketchup. These results confirm consumers' perception of the quality of private label brands. In a recent study by Consumer Network, when panelists were asked whether "store brand quality is generally inferior to national brands", 98% indicated that the statement is false (Donegan). Private labels had higher value rankings than the national brands of all products, except salad dressings and coffee creamers. In

fact, for 60 percent of the products, private labels were significantly different than national brands. Obviously, consumers could make substantial savings and yet purchase higher quality products, if their knowledge of the market were increased.

Table 3 contains the parameter estimates of the product price model. A regression model was estimated for each product category, as well as for the entire sample. The overall model was estimated by allowing for a separate intercept for each product category, and, therefore, no intercept term was published for this equation. In the overall model, quality was positively related to price. This result, which also was found in a similar study by Wills, indicates that consumers are not entirely ignorant of product quality. Yet, the quality coefficient for most of the individual product categories was not significant. Also, the quality coefficient for some of the product categories exhibited a negative sign. The package size coefficient was significant and negative in the overall model, indicating that, on average, most products sold in larger package sizes were offered at lower prices. Generally, the relationship held for most of the individual product categories, with the exception of tuna, macaroni & cheese, and assorted soups for which larger package sizes carried higher prices.

Brand label was significant in the overall model and in half of the individual product equations. As expected, for most products, the sign on the label coefficient was negative--indicating that national brands were more expensive than private labels. However, ketchup and coffee creamers were exceptions, with national brands being priced lower.

Table 4 contains parameter estimates for the product value model. For the overall model, both package size and label were significant. As expected, products that were offered in larger package sizes provided consumers with better value. About three-fourths of the individual package size coefficients were significant and positive. A priori, we expected that consumers would receive more value for larger package sizes, as is indicated by the models. Also, private label brands offered consumers higher value than national brands; about 40 percent of the coefficients for individual product labels were significant and positive. None of the product categories indicated more value for national than private label brands.

CONCLUDING REMARKS

Price may be a poor market signal of quality for most food products. The correlations, t-tests, and regression equations depicted a weak relationship between price and quality. On average, national brands and private label brands provide similar objective quality. The t-tests and value equations illustrated that, on average, private label products tend to offer better values than national brands. Large savings can be achieved by purchasing private label products rather than national brand counterparts. The conventional wisdom of "you get what you pay for" appears to be challenged by these results.

This idea may be reinforced and supported by other factors. For example, consumers may believe that manufacturers who produce products on a cost plus markup basis would charge higher prices for products made from better ingredients with more stringent quality controls. In addition,

advertising of national brands can serve to reinforce the price-quality schema, while providing consumers with, in many cases, the only readily available source of product information. The continuous proliferation of "new" food products on the marketplace makes it very difficult for consumers to obtain unbiased information. Since food products are relatively inexpensive and consumers spend only a small percentage of their disposable income on food, the perceived risk associated with "making the wrong choice" can be easily offset by the convenience of buying the "trusted" national brand for a few cents more.

The value equations reflect an informationally imperfect marketplace. Consumers are buying brands that, by our measurements, are inefficient. Consumers choose to buy products based upon some perceived quality and price combinations. These choices are made based upon the knowledge base the consumers have. Some consumers are less informed than others, because of the cost of obtaining information relative to the expected marginal gains from being more informed. This confirms Schwartz and Wilde's contention that firms exploit imperfect consumer information by charging higher prices.

One alternative solution would be to attempt to increase consumer knowledge of the markets, their prices, and their qualities (Steenkamp). An obvious way of enhancing consumer knowledge would be through the dissemination of test results. However, most consumer organizations prohibit firms from using test results in advertisements. Perhaps the consumer organizations could be convinced to allow a wider dissemination of this information through the use of point-of-purchase information.

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Table 1. Price-Quality Correlations for Food Product Categories

Product Category	Number of Brands Tested National	Private-Label	Publication Date	Spearman-Rho Correlation Coefficient	Significance Level
Assorted Soups	53	19	Mar 1987	0.18	0.13
Beef Stew	20	5	May 1981	-0.21	0.31
Bologna	42	8	Aug 1980	0.47	0.00
Canned Tuna	43	23	Mar 1985	0.38	0.00
Canned Salmon	29	4	Aug 1981	0.37	0.03
Canned & Packaged Soup	35	15	Sep 1971	-0.03	0.86
Cheese Slices	12	10	Feb 1983	0.10	0.65
Chili	41	6	Oct 1974	0.08	0.58
Choc. Chip Cookies	25	9	Feb 1985	0.74	0.00
Chocolate Mixes	16	5	Sep 1976	0.08	0.73
Coffee Creamers	8	6	Mar 1983	-0.53	0.05
Cooking Oils	17	34	June 1985	-0.23	0.11
Cottage Cheese	36	18	Mar 1986	-0.09	0.51
Frozen Cake	14	11	Jan 1970	-0.16	0.45
Ground Coffee	17	10	Mar 1983	-0.11	0.60

Table 1. Continued

Product Category	Number of Brands Tested National	Private-Label	Publication Date	Spearman-Rho Correlation Coefficient	Significance Level
Hot Dogs	52	11	June 1986	-0.16	0.20
Instant Coffee	24	17	May 1985	0.46	0.00
Instant Potatoes	14	18	May 1984	-0.61	0.00
Macaroni & Cheese	19	15	June 1983	0.22	0.11
Mayonnaise	15	23	Oct 1984	-0.26	0.12
Peanut Butter	22	8	Oct 1982	0.02	0.93
Potpies	18	6	Aug 1975	0.80	0.00
Salad Dressing	24	8	Mar 1977	0.13	0.48
Sliced Bacon	37	4	Sep 1981	-0.25	0.11
Spaghetti Sauce	37	13	Oct 1985	0.03	0.81
Strawberry Preserves	33	11	Aug 1985	-0.24	0.12
Stuffing Mix	15	6	Nov 1983	-0.08	0.74
Tomato Ketchup	8	10	Oct 1983	-0.23	0.35
Tomato Juice	15	5	Sep 1983	0.03	0.91

Table 2. Private Label as a Percent of National Brands with T-tests on Differences

Product Category	Price/ Ounce	Package Size (oz.)	Quality	Value	T-test for Quality	T-test for Value
Assorted Soups	42	111	104	213	-1.18	2.07**
Beef Stew	65	134	103	140	0.30	2.20**
Bologna	74	113	99	124	-0.16	1.94*
Can and Packaged Soups	44	110	93	139	0.77	5.27***
Canned Salmon	82	94	88	101	-1.13	0.07
Canned Tuna	81	100	92	112	-1.54	1.72*
Cheese Slices	81	105	106	132	0.66	3.44**
Chili	73	93	85	108	-1.82*	0.34
Chocolate Mixes	69	133	90	127	-0.98	1.74*
Chocolate Chip Cookies	79	116	85	120	-2.13**	1.30
Coffee Creamers	107	118	110	61	0.90	-1.19
Cooking Oils	60	103	107	159	1.10	4.01***
Cottage Cheese	91	94	110	119	1.72*	2.18**
Frozen Cake	88	101	88	101	-1.69	0.13
Ground Coffee	84	98	96	115	-0.44	1.30

Table 2. Continued

Product Category	Price/ Ounce	Package Size (oz.)	Quality	Value	T-test for Quality	T-test for Value
Hot Dogs	78	105	102	116	0.23	1.02
Instant Coffee	77	110	90	121	-1.70*	2.28**
Instant Potatoes	92	108	89	103	-1.61	0.20
Macaroni and Cheese	70	96	88	133	-1.98*	1.64
Mayonnaise	58	125	99	160	-0.13	2.90***
Peanut Butter	70	166	98	130	-0.23	2.41**
Pot Pies	69	83	77	104	-3.06***	0.35
Salad Dressing	92	92	89	94	-1.36	-0.47
Sliced Bacon	69	110	105	126	0.44	1.21
Spaghetti Sauce	78	107	98	121	-0.36	2.33**
Strawberry Preserves	48	159	105	186	0.73	5.04***
Stuffing Mix	94	97	125	134	2.82**	3.30***
Tomato Ketchup	46	134	124	206	2.54**	5.14***
Tomato Juice	63	133	109	154	0.83	2.93***

Note: *, **, *** are significant at the 0.10, 0.05, and 0.01 levels, respectively.

Table 3. Parameter Estimates of Determinants of Product Price

Product Categories	Observations	Intercept	Quality	Package Size (Oz)	Brand Label	R^2
All Products	1079		0.0022**	-0.005***	-0.094***	0.93
			(2.54)	(-3.36)	(-4.79)	
Assorted Soups	71	0.03	-0.0000	0.005***	-0.051***	0.32
		(1.27)	(-0.05)	(3.78)	(-4.44)	
Beef Stew	24	0.96	0.001	-0.016	-0.154	0.19
		(2.21)	(0.21)	(-1.66)	(-0.80)	
Bologna	50	0.49	0.0033*	-0.019***	-0.072	0.42
		(4.19)	(1.82)	(-4.17)	(-1.63)	
Can & Packaged Soups	49	0.03	0.0004**	-0.003***	-0.006**	0.68
		(4.49)	(2.32)	(-9.00)	(-2.03)	
Canned Salmon	32	0.34	0.0012	-0.014***	-0.046*	0.66
		(6.10)	(1.33)	(-6.82)	(-1.76)	
Canned Tuna	65	-0.08	0.0005	0.038*	-0.034***	0.22
		(-0.58)	(0.78)	(1.70)	(-3.11)	
Cheese Slices	21	0.18	0.0005	-0.002	-0.035***	0.66
		(6.13)	(1.60)	(-1.32)	(-5.30)	
Chili	46	0.02	0.0004**	-0.001*	-0.004	0.15
		(1.36)	(2.08)	(-1.86)	(-0.66)	
Chocolate Mixes	20	0.08	-0.0000	-0.002**	-0.012**	0.58
		(6.68)	(-0.12)	(-2.67)	(-2.20)	

Table 3. Continued...

Product Categories	Observations	Intercept	Quality	Package Size (Oz)	Brand Label	R^2
Chocolate Chip Cookies	33	-0.08	0.0069***	-0.007**	0.032	0.42
		(-0.80)	(4.23)	(-2.03)	(0.85)	
Coffee Creamers	13	0.30	-0.0028***	-0.006***	0.035**	0.74
		(7.09)	(-4.08)	(-3.36)	(2.45)	
Cooking Oils	50	0.16	-0.0002	-0.001***	-0.038***	0.54
		(8.21)	(-0.64)	(-4.77)	(-4.96)	
Cottage Cheese	53	0.56	-0.0005	-0.009**	-0.042*	0.13
		(7.41)	(-0.46)	(-2.11)	(-1.76)	
Frozen Cake	24	0.03	5.75	-0.001	-0.003*	0.23
		(4.04)	(0.07)	(-1.42)	(-1.80)	
Ground Coffee	26	0.33	-0.0007	-0.005	-0.038***	0.33
		(5.72)	(-1.11)	(-1.64)	(-2.86)	
Hot Dogs	62	0.52	-0.0006	-0.023***	-0.014	0.46
		(8.79)	(-1.15)	(-6.54)	(-1.04)	
Instant Coffee	40	7.37	0.0182	-0.329***	-0.982***	0.49
		(5.84)	(1.05)	(-3.77)	(-2.88)	
Instant Potatoes	31	0.25	-0.0015**	-0.004***	-0.017	0.59
		(8.36)	(-2.39)	(-3.73)	(-1.61)	
Macaroni & Cheese	33	-0.07	0.002	0.047**	-0.097	0.27
		(-0.29)	(0.56)	(2.74)	(-1.25)	

Table 3. Continued...

Product Categories	Observations	Intercept	Quality	Package Size (Oz)	Brand Label	R^2
Mayonnaise	37	0.18	-0.0010**	-0.002***	-0.034***	0.52
		(7.42)	(-2.34)	(-2.72)	(-3.82)	
Peanut Butter	29	0.19	-0.0003	-0.002*	-0.023	0.26
		(4.33)	(-0.43)	(-1.75)	(-1.07)	
Potpies	23	0.00	0.0005	0.001	-0.004	0.36
		(0.05)	(1.52)	(0.97)	(-0.60)	
Salad Dressing	31	0.05	0.0000	-0.001**	-0.004	0.21
		(5.62)	(0.19)	(-2.47)	(-1.47)	
Sliced Bacon	40	0.48	-0.0033***	-0.011***	-0.019	0.53
		(8.19)	(-3.28)	(-5.04)	(-0.57)	
Spaghetti Sauce	49	0.11	0.0002	-0.002***	0.011***	0.37
		(7.09)	(1.32)	(-3.33)	(-2.77)	
Strawberry Preserves	43	0.28	-0.0003	-0.005***	-0.043	0.38
		(4.65)	(-0.26)	(-3.16)	(-1.40)	
Stuffing Mixes	20	0.26	-0.0003	-0.011***	-0.009	0.40
		(7.40)	(-0.65)	(-3.00)	(-1.10)	
Tomato Ketchup	17	0.36	-0.0044***	-0.005***	0.025***	0.95
		(15.29)	(-10.97)	(-11.13)	(3.29)	
Tomato Juice	19	0.28	0.0022***	-0.005***	-0.021	0.89
		(7.26)	(3.14)	(-9.76)	(-1.27)	

Note: *, **, *** are significant at the 0.10, 0.05, and 0.01 levels, respectively.

Table 4. Parameter Estimates of Determinants of Product Value

Product Category	Observations	Intercept	Pkg.\ Price	Label\ Price	R^2
All Products	1079	25.68	1.42***	19.23***	0.86
		(1.24)	(22.28)	(32.39)	
Assorted Soups	71	374.35	1.00*	17.22***	0.87
		(6.06)	(1.75)	(5.99)	
Beef Stew	24	43.48	0.33	14.12**	0.45
		(3.73)	(0.83)	(2.45)	
Bologna	50	74.40	0.99***	7.13**	0.60
		(8.44)	(3.78)	(2.65)	
Can & Packaged Soup	49	624.28	3.90***	1.52	0.91
		(2.23)	(13.34)	(0.80)	
Canned Salmon	32	142.63	1.53***	0.41	0.51
		(5.99)	(4.42)	(0.09)	
Canned Tuna	65	45.37	7.09***	-3.88	0.45
		(1.29)	(5.72)	(-1.55)	
Cheese Slices	21	230.18	-0.40	11.32***	0.40
		(4.18)	(-0.43)	(2.86)	
Chili	46	873.93	1.40***	9.18***	0.81
		(4.80)	(8.72)	(3.28)	
Choc. Chip Cookies	33	168.94	1.62***	0.64	0.73
		(7.12)	(5.43)	(0.25)	
Chocolate Mixes	20	602.04	1.40**	-1.01	0.44
		(6.05)	(2.29)	(-0.18)	
Coffee Creamers	13	-10.59	3.76***	-5.93	0.87
		(-0.06)	(4.63)	(-0.43)	
Cooking Oils	50	242.98	0.33***	11.52***	0.68
		(3.92)	(4.79)	(5.11)	
Cottage Cheese	53	30.04	1.80***	9.50***	0.53
		(2.14)	(5.12)	(3.86)	
Frozen Cake	24	1587.87	0.55	3.18	0.09
		(3.90)	(0.74)	(0.80)	
Ground Coffee	26	84.58	1.85**	3.39	0.39
		(1.77)	(2.66)	(0.85)	

Table 4. Continued

Product Category	Observations	Intercept	Pkg./ Price	Brand Label	R^2
Hot Dogs	62	0.41 (0.01)	3.13*** (8.48)	1.34 (0.36)	0.73
Instant Coffee	40	6.13 (8.05)	1.44** (2.19)	4.87 (1.68)	0.48
Instant Potatoes	31	184.73 (4.25)	1.35*** (4.40)	9.13** (2.38)	0.69
Macaroni & Cheese	33	10.32 (0.62)	5.82*** (6.11)	2.28 (0.74)	0.85
Mayonnaise	37	256.38 (3.97)	0.86*** (3.64)	9.23** (2.36)	0.79
Peanut Butter	29	277.39 (6.67)	0.20 (0.72)	8.75* (1.72)	0.30
Potpies	23	853.83 (2.64)	2.41** (2.17)	1.95 (0.61)	0.26
Salad Dressing	31	902.37 (4.63)	1.06*** (3.97)	2.18 (0.50)	0.41
Sliced Bacon	40	208.43 (5.67)	0.88*** (3.96)	9.40* (1.98)	0.62
Spaghetti Sauce	49	188.00 (2.28)	1.35*** (5.99)	-2.29 (-0.79)	0.58
Strawberry Preserves	43	190.03 (9.32)	1.02*** (6.19)	4.34 (1.53)	0.86
Stuffing Mix	20	188.59 (3.57)	-0.41 (-0.31)	15.91*** (4.04)	0.48
Tomato Ketchup	17	365.37 (3.67)	-0.34 (-1.54)	24.12*** (6.60)	0.82
Tomato Juice	19	108.50 (3.57)	0.66*** (4.02)	4.43 (1.03)	0.77

Note: *, **, *** are significant at the 0.10, 0.05, and 0.01 levels, respectively.