Demand for Yogurt in the Trend of Manufacturer Brand and Organic Information

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Abstract

The random coefficients multinomial logit model was used to study the demand for yogurt which is differentiated by manufacturer brands and organic information. For this purpose, we used the scanner-level data set collected by the Information Resource Incorporated at the chain level. General Mills and Danone are the two brands with the highest market shares. In general, demand for yogurt has found to be elastic for all brands. On average, consumers are more price-sensitive to non-organic brands than organic brands. Results revealed some degree of brand loyalty and the switching behavior among yogurt consumers.

Key words: demand, elasticity, yogurt, BLP

JEL codes: C25, C26, Q11

Introduction

In the context of current dietary practices, it is difficult for most individuals to meet national guidance goals unless they are consuming dairy products (U.S. Department of Health and Human Services). The per capita consumption of dairy products has changed over the last four decades in the U.S. This is at the time which all Americans ages nine and older are encouraged to consume three cups of fat-free or lowfat fluid milk or equivalent milk products per day (Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010).

However, the consumption of fluid milk has decreased over time, the consumption of other manufactured dairy products such as cheese, ice cream, yogurt, and butter, has increased (Blayney, 2010). Yogurt is the fourth largest dairy category at the retail level in the U.S. (Hovhannisyan and Bozic, 2013). The per capita consumption of yogurt has increased from 3.6 pounds per person in 1984 to 14.9 pounds per person in 2014, a 413% increase (USDA, 2016).

Dairy products like yogurt has identified as a single aggregated product. As the consumer tastes and preferences changed towards much healthier products, producers have started with supplying differentiated products in order to meet the needs of their customers and to keep them ahead of their competitors. What drives consumers to choose one type of yogurt over another is important for researchers to better understand the consumer behavior and is also necessary for firms for developing a future marketing strategies.

The degree of product differentiation is another element of market structure that plays an important role in influencing the conduct and performance of markets (Connor, et al, 1985). In the context of marketing, product differentiation initiates making a product slightly different in its characteristics from that of its competitors by contrasting its unique qualities with other competing products to make it more attractive to a particular target market. Consumers have to find the offered products, as imperfect substitutes. Otherwise, the producer does not get an advantage.

The yogurt category is the good example of both vertical and horizontal differentiation types. The General Mills, for example, offer four brands of yogurt: Yoplait, Mountain High, Liberte, and Annie’s. Yoplait which considers a leader in the multi-billion dollar U.S. yogurt category, offers regular yogurt, greek yogurt, and kid yogurt. Each of these vertically differentiated products is also horizontally differentiated based on different flavors. As a result grocery stores provide consumers with product choices differentiated by manufacturer brand, size, packaging, and flavor.

Numerous studies have examined the demand of dairy products in the United States including yogurt. Early studies identified yogurt as a single aggregated product but as consumer preferences changed and more differentiated types have introduced, studying demand of yogurt became more specific. While most studies have focused on estimating elasticities, some have focused on the effect of non-economic factors that have an impact on demand.

As an early study, Boehm (1975) used household panel data from April 1972 to April 1973 to estimate household demand structure for thirteen major dairy products in the Sothern United States using cross-sectional and time-series models. The first model was basically used to capture the effect of income differences on household consumption response while the second model aimed to estimate the short-run market response to changes in a product’s own price, as well as to changes in the product’s substitute and complement prices. This study revealed that household consumption of dairy products in the South tend to be lower than the national average due to the higher prices of dairy products in the South, and lower household income in the South compared to U.S. households generally. An increase in income may lead to increase the purchases of yogurt more than other dairy products.

Davis, et.al, (2010) used Nielsen Homescan data set to estimate the effect of total expenditure and demographic factors that affect demand of refrigerated, frozen and drinkable yogurt using translog demand system. This study showed that each of refrigerated yogurt and drinkable yogurt were net substitutes for frozen yogurt and the latter did not play any major role in consumers' preferences. Demographic factors found to be significant only for frozen and drinkable yogurt. Presence of children in a household had a negative impact on demand of frozen yogurt while the impact was positive for drinkable yogurt. This paper revealed that yogurt prices and household's income played an important role on the demand of yogurt.

In another study, Davis et.al, (2011) used Nielsen 2007 Homescan purchase data to derive the demand elasticities for sixteen products including refrigerated yogurt and frozen yogurt using a censored Almost Ideal Demand System (AIDS) model. Both uncompensated and compensated own-price elasticities were equal to one or greater for frozen yogurt but not for refrigerated yogurt. This study revealed that ice cream is a net substitute for yogurt, and also refrigerated yogurt is a net substitute for frozen yogurt. In addition to the substitution relationships, frozen yogurt is found to be a net complement to refrigerated yogurt.

One study most comparable to the present analysis was conducted by Vilas-Boas (2007). She used different models of vertical relationships between manufacturers and retailers to select the model most consistent with the data from the yogurt market in the supermarket industry in the Midwestern metropolitan area. She estimated demand using a random coefficients discrete choice model for differentiated products, and then used the demand estimates to compute price-cost margins for retailers and manufacturers. She compared estimated price-cost margins with the price-cost margins estimated using components of marginal costs to assess the fit of different vertical models.

The study offered that wholesale prices are close to marginal cost and retailers have pricing power in the vertical chain.

Finally, Hovhannisyan and Bozic (2013) provided the benefit-function approach to model inverse demand system and then extended its application by using the conjectural variation approach to study the market performance of U.S. branded yogurt using product-level scanner data from 2001 to 2006. Results showed that there is an imperfect competition market for yogurt in the United States, but lower Lerner indices for retail margins compared to previous studies. National brand yogurt play an important role in retailers' profitability while consumers had relatively lower preferences for store brand yogurt.

Knowing the distribution of consumer preferences within a market would help both producers and retailers to manage their marketing activities. The main objective of this study is to estimate demand relationships in the differentiated yogurt market focusing on the manufacturer brand and to figure out whether yogurt consumers show preferences for organic brands. For this purpose, we follow the study by Vilas-Boas (2007) to determine the elasticities of different manufacturer brands, but we distinguish our study from the previous one is that in this study we considered a higher range of manufacturer brands in the yogurt market. In addition, the data set provided us with the actual yogurt consumers who made purchases during each week of the study to account for consumers' heterogeneity.

In the next section, a random coefficient multinomial logit demand model is introduced. Then we presented data definitions and sources and later the main findings of this study. Finally, conclusion and extension of this study are presented.

Model

The traditional approach to estimate demand is using the Almost Ideal Demand System (AIDS) introduced by Deaton and Muellbauer (1980). As the differentiation increase, estimation process becomes more complicated using this model as a result of large number of parameters to be estimated even after imposing a symmetry restriction. In addition, AIDS model assumes homogenous consumer preferences (Lianos and Genakos, 2012). Appropriately the most convenient way to estimate demand using a product level scanner data is to use the discrete choice model, known as the BLP model, introduced by Berry, Levinsohn, and Pakes (1995) which involves the prediction of a consumer's response given different alternatives where only one decision has to be made.

The BLP model, which is an extension to the logit model, allows for endogeneity prices problem to be addressed in addition to unobserved product characteristics and consumer heterogeneity. This model has applied to various markets including automobiles (Berry, Levinsohn, and Pakes, 1995), breakfast cereals (Nevo, 2000, 2001), milk (Lopez and Lopez, 2009; Chidmi and Murova, 2011), yogurt (Villas-Boas, 2007), and eggs (Heng, 2015).

Consumers are assumed to choose among differentiated products each period, the indirect utility of consumer *i* from purchasing product *j* at time *t* can be specified as:

$$U_{ijt} = x'_{jt}\beta_i - \alpha_i p_{jt} + \xi_{jt} + \epsilon_{ijt} \tag{1}$$

Where x_{jt} is a vector of observed product characteristics, p_{jt} is the price of product j, ξ_{jt} represents the mean across consumers of unobserved product characteristics like deviations from observed product quality that are common to all individuals (Vincent, 2015), ϵ_{ijt} is the distribution of consumer preferences about this mean, and β_i and α_i are parameters to be estimated that represent individual taste and marginal utility of price. These parameters are allowed to vary across consumers and take into account consumers' heterogeneity according to:

$$\binom{\beta_i}{\alpha_i} = \binom{\beta}{\alpha} + \delta D_i + \theta v_i \tag{2}$$

Where $\binom{\beta}{\alpha}$ captures the mean of the random coefficients, D_i represents observed consumer characteristics such as the number of children, v_i represents consumer unobserved characteristics, δ and θ are matrices of parameters that captures the observable and unobservable consumers' heterogeneity. If the mean utility level can be written as:

$$\pi_{ijt} = x'_{jt}\beta_i - \alpha_i p_{jt} + \xi_{jt} \tag{3}$$

Then the variation made by the interaction of consumer *i* tendency and product *j* characteristics can be expressed by:

$$\varphi_{ijt}\ (x_{jt}, p_{jt}, D_i, v_i;\ \delta, \theta) = \binom{-p_{jt}}{x_{jt}} (\delta D_i + \theta v_i) \tag{4}$$

Substituting equation (3) and (4) into equation (1) yields:

$$U_{ijt} = \pi_{ijt} + \varphi_{ijt} + \epsilon_{ijt} \tag{5}$$

A consumer who purchases one unit of yogurt *j* among all possible brands available at time *t*, can be defined as:

$$I_{jt}(x_t, p_t, \pi_t;\ \delta, \theta) = (D_i, v_i, \epsilon_{it}) \mid U_{ijt} \geq U_{ikt} \qquad \forall k = 0, \ldots, F_t \tag{6}$$

Aggregating over consumers in the market, the market share of brand *j* at time *t* is given by the probability that brand *j* is chosen:

$$s_{jt} = \int \{(D_i, v_i, \epsilon_{it}) \mid U_{ijt} \geq U_{ikt}\ \forall k = 0, \ldots, F_t\}\ dM(D)\ dQ(v)\ dY(\epsilon) \tag{7}$$

Where *M*, *Q*, and *Y* are the probability distributions for variables *D*, *v*, and ϵ respectively.

The demand elasticity for brand *j* with respect to the price change of brand *k* can be estimated using the partial derivative of the market share:

$$\eta_{jk} = \frac{\partial s_{jt}}{\partial p_{kt}} = \begin{cases} \int \alpha_i s_{ijt}\left(1 - s_{ijt}\right) dM(D)\, dQ(v) & for\ j = k \\ -\int \alpha_i s_{ijt} s_{ikt}\ dM(D)\, dQ(v) & otherwise \end{cases} \tag{8}$$

Data

Weekly data-set on household purchases of yogurt produced by different manufacturers collected by Information Resource Inc. (IRI) at the chain level has used for Eau Claire, Wisconsin, for the year 2011. The data provide information for each product at the Universal Product Code (UPC) level, dollar sales, volume sales, retailer, and weeks. Information on product characteristics are obtained from the product category data-set which contains information on brand, UPC, volume equivalent, flavor, fat content, organic information, and package. Using volume equivalent information, volume sales are converted to a product quantity to correspond to the same volume for all purchases. Then, retail prices are obtained by dividing the dollar sales on quantities.

Since UPC codes change due to the changes in calorie level, package, organic information, etc., therefore, 136 types of yogurt are obtained. These types were characterized by product characteristics such as brand, flavor, and fat content where available choices varied from 56 to 86 types among weeks. Since this large number of products makes the estimation difficult, choices are made at the manufacturer level which is twenty-three manufacturers. In addition, aggregating products using product characteristics may yield inconsistent results due to researchers' different opinion on grouping (Heng, 2015).

As a result, the market shares of the all manufacturer brands in the market are obtained by dividing the product quantity by the total quantity in the market that covers the purchases in two retail stores, located less than five miles from each other. General Mills, Danone, and H P Hood are the three brands with the highest market shares respectively. Meanwhile, Pulmoune, Liberty Products INC, and Seven Stars Farm have the lowest market shares respectively. Table 1 presents the market share of all manufacturer brands in the studying sample.

Following Villas-Boas (2007) and Chidmi and Murova (2011), instrumental variables (IV) are used for the endogeneity of the yogurt prices. In the first IV data set, we used each of the dry milk price in U.S., corn price in Wisconsin, and the average hourly earnings in dairy products industry in Wisconsin, where all relates to the manufacturer costs. Dry milk prices are obtained from Federal Milk Marketing Order, corn prices are obtained from National Agriculture Statistics Service (NASS), and average hourly earnings are obtained from the U.S. Bureau of Labor Statistics.

In the second IV data set, we used each of the average retail price of electricity for industrial use in Wisconsin, and the Midwest retail gasoline prices which relate to retailer costs. The first data is obtained from the U.S. Department of Energy website, while the second is obtained from the U.S. Energy Information Administration. Summery statistics of instrumental variables are represented in table 2. Since IV's are reported monthly, the weekly yogurt sales, prices, and shares were aggregated into twelve months and each month is treated as a market.

Data is complemented with the number of children in each household in order to take into account the consumers' heterogeneity. This information is also obtained from the panel demographics data-set for the actual yogurt consumers who made purchases during the year of 2011. For each market, a characteristic of 400 individuals were randomly selected.

Results

As the first step, the overidentifying restrictions test has used to check the validity of the instrumental variables. The test failed to reject the null hypothesis of no correlation between the instrumental variables and the error term concluding that the instruments are valid. The parameter estimates for the random coefficients multinomial logit demand model given by equation (7) are summarized in table 3. The retail price and the organic information dummy variables enter linearly the mean utility variation, and are also interacted with the number of children group of the households.

As expected, the parameter of the retail price is negative and statistically significant implying that higher prices do reduce utility for yogurt consumers. The non-statistically significance of the dummy variable related to the organic information of the yogurt revealed that, on average, individuals did not show preferences for organic products. This might be related to the higher prices of organic products compared to non-organic products as consumers are price sensitive and higher prices are resulted in lower utility. The presence of children in the household does not have any impact on the individuals' decision on the price of the product and the organic choice. The non-significance of the constant term explains how likely consumers buy other yogurt types not included in the sample.

Using equation (8), own - and cross - price elasticities were computed and the results are summarized in table 4. As expected, all own-price elasticities were negative, varying from -2.306 to -5.407 for organic products[1] and from -2.643 to -4.501 for non-organic products. The own-price elasticities show that demand for yogurt at the manufacturer brand level is elastic. This result is

[1] Pulmuone, Wallaby, Whole Soy CO, Kalona, and Danone (organic)

consistent with the differentiated demand results of Villas-Boas (2007) where she reports an average own-price elasticity of -5.64 for yogurt at the brand-store level. Estimation of cross-price elasticities shows interesting results. Note that cross-price elasticities are much lower, in absolute value, than the own-price elasticities suggesting that consumers tend to have some degree of brand loyalty for yogurt.

Among organic products, demand for Pulmuone tended to be more elastic with the own-price elasticity of -5.407 while organic Danone has the lowest own-price elasticity of -2.306 suggesting the organic Danone consumers are less price sensitive to its price changes. Whole Soy brand considers the most competitive brand to Pulmuone where 1% increase in the price of Pulmuone will increase the demand for Whole Soy by 0.009% which is the highest one among organic brands. Meanwhile a 1% increase in the price of Whole Soy will induce a 0.016% increase in the demand of Pulmuone. In the same way, Kalona represents the most substitute brand for organic Danone where a 1% increase in the price of organic Danone will increase a 0.081% in the demand of Kalona while a 1% increase in the price of Kalona will increase the demand of organic Danone by 0.034%.

One of the most interesting result of this paper can be summarized in the some degree of organic loyalty for organic yogurt consumers. By looking at the cross-prices elasticities related to the 1% increase in the price of Wallaby brand, for example, we can simply notice that the effect of change in the demand of organic products is much higher compared to the effect of change in the demand of non-organic products. In other word, as the price of one organic brand increases, organic consumers tend to switch to other organic brands more compared to non-organic brands.

Among non-organic products, Old Home Foods has the lowest own-price elasticity of -2.643 while the Hain Celestial has the highest own-price elasticity of -4.501. For the first brand, Cascade considers the most substitute brand where 1% increase in the price of the Old Home Food will increase the demand of Cascade by 0.01% while for the Hain Celestial, the most substitute brand is the Fage USA as a 1% increase in the price of the Hain Celestial will increase the demand for the Fage USA brand by 0.009%.

For those brands with the highest market shares, Danone considers the most substitute brand for the General Mills compared to H P Hood where a 1% increase in the price of General Mills will increase the demand of the H P Hood brand by 0.27% while increases the demand of Danone by 0.31%. In the same way, General Mills consider the most substitute brand for Danone compared to H P Hood while Danone considers the most substitute brand for H P Hood compared to the General Mills. For each of General Mills and Dannon which account for 60% of the total market share together (Villas-Boas, 2007), the Fage USA considers the most substitute brand among non-organic products.

The second most interesting result of this paper is the switching behavior of non-organic yogurt consumers as the price of non-organic brands increase. By looking at the cross-price elasticities of a 1% increase in the price of General Mills, for example, we can notice that the effect of a change in the demand of organic brands is much higher compared to the effect of a change in the demand of non-organic brands which reveals the switching behavior of non-organic yogurt consumers to organic brands in the case of an increase in the price of the non-organic brands.

Conclusion

The random coefficients multinomial logit model reveals very interesting results while studying the demand in the yogurt market. Results indicate that consumers are price sensitive and they do not show preferences for organic brands that could be resulted from higher prices. As expected, the presence of children in the household does not have a significant impact on the individuals' choices. In general, demand for yogurt is elastic for both organic and non-organic types. However, General Mills and Danone are the two manufacturer brands with the highest market shares, Fage USA considers the most competitive and substitute brand for both of them in the yogurt market.

On average, consumers are more price-sensitive to non-organic yogurt than organic yogurt where the mean of own-price elasticities for non-organic brands is -3.79 while this value equals -3.73 for organic brands. The most interesting result of this paper is the some degree of brand loyalty for organic yogurt consumers in addition to the switching behavior of non-organic consumers to most organic brands in the case of an increase in the price of non-organic brands.

An extension of this paper is to use the demand estimates in order to compute the price-cost margins for retailers in the yogurt market. For this purpose, a leader follower (Stackelberg) framework, a joint-profit maximization (monopoly) conduct, in addition to the widely used Bertrand-Nash pricing conduct can be assumed to determine the most consistent game structure in the U.S. yogurt market.

References

Berry, S., J. Levinsohn, and A. Pakes. 1995. “Automobile Prices in Market Equilibrium.” *Econometrica* 63: 841-890.

Blayney, D. P. 2010. “Milk Utilization Patterns in the U.S. Presentation to the Dairy Industry Advisory Committee.” Retrieved from: http://www.fsa.usda.gov/Internet/FSA_File/1_3_utiliz_blayney.pdf.

Boehm, T. William. 1975. “The Household Demand for Major Dairy Products in the Southern Region.” *Southern Journal of Agricultural Economics* 7(2): 187-196.

CEAS Consultants (Wye) Ltd, Centre for European Agricultural Studies, and Institute for the Management of Dairy Companies, Technische Universitat München. 1999. Evaluation of the School Milk Measure, Final Report. Retrieved from: http://ec.europa.eu/agriculture/eval/reports/schoolmilk/sum_en.pdf

Chidmi, B., and O. Murova. 2011. “Measuring Market Power in the Supermarket Industry: The Case of the Seattle-Tacoma Fluid Milk Market.” *Agribusiness*, Vol. 27 (4): 435-449.

Connor, J.M., Rogers, R.T., Marion, B.W., and W.F. Mueller. 1985. “The Food Manufacturing Industries: Structure, Strategies, Performance, and Policies.” Lexington Books: D.C. Heath and Company.

Davis, C.G., Blayney, D., Muhammad, A., Yen, S.T., and J. Cooper. 2010. “A Cross-Sectional Analysis of U.S. Yogurt Demand.” *Journal of Food Distribution Research* 41(2).

Davis, C.G., Yen, S.T., Dong, D., and D.P. Blayney. 2011. “Assessing Economic and Demographic Factors that Influence United States Dairy Demand.” *Journal of Dairy Science* 94 (7).

Deaton, A.S., and J. Muellbauer. 1980. “An Almost Ideal Demand System.” *American Economic Review*, 70: 312-326.

Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010. Retrieved from: http://www.cnpp.usda.gov/DGAs2010-DGACReport.htm.

Heng, Y. 2015. “Three Essays on Differentiated Products and Heterogeneous Consumer Preferences: The Case of Table Eggs.” Ph.D. Dissertation. Department of Agricultural Economics, College of Agriculture, Kansas State University. Retrieved from: https://krex.k-state.edu/dspace/bitstream/handle/2097/18993/YanHeng2015.pdf?sequence=2.

Hovhannisyan, V., and M. Bozic. 2013. “A Benefit-Function Approach to Studying Market Power: An Application to the U.S. Yogurt Market.” *Journal of Agricultural and Resource Economics* 38(2):159-173.

Hovhannisyan, V. and M. Bozic. 2014. “Retailer Motivation to Adjust Milk Prices: An Analysis Using Superelasticity of Demand.” *Agribusiness*, 30(2): 195-206.

Lianos, I. and C. Genakos. 2012. “Econometric Evidence in EU Competition Law: An Empirical and Theoretical Analysis.” *CLES Research Paper Series*. Retrieved from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2184563.

Lopez, E., and R.A. Lopez. 2009. “Demand for Differentiated Milk Products: Implications for Price Competition.” *Agribusiness*. 25(4): 453-465.

Nevo, A. 2000. “Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry.” *The RAND Journal of Economics*. 31(3), 395-421.

Nevo, A. 2001. “Measuring Market Power in the Ready-to-Eat Cereal Industry.” *Econometrica*. 69(2): 307-342.

U.S. Bureau of Labor Statistics. 2011. State and Area Employment, Hours, and Earnings (SIC). Retrieved from: http://data.bls.gov/pdq/querytool.jsp?survey=sa.

U.S. Department of Agriculture. 2011. Agriculture Marketing Service, Dairy Programs. Federal Milk Marketing Order 30. Retrieved from: http://www.fmma30.com/DairyNews.html.

U.S. Department of Agriculture. 2016. National Agricultural Statistics Service. Dairy Products: Per Capita Consumption. Retrieved from: https://www.ers.usda.gov/data-products/dairy-data/dairy-data/#Data files

U.S. Department of Agriculture. 2011. Agricultural Statistics Board, National Agriculture Statistics Service, Agricultural Prices. Retrieved from: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do;jsessionid=F154BA78C7C50C021C8CA924EDB72FD5?documentID=1002

U.S. Department of Energy. 2011. Energy Information Administration, Independent Statistics and Analysis. Retrieved from: http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_a.

U.S. Department of Health and Human Services. 2000. Understanding and Improving Health. 2nd Edition. Retrieved from: www.healthypeople.gov/document/.

U.S. Energy Information Administration. 2011. Midwest All Grades All Formulations Retail Gasoline Prices. Retrieved from: http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emm_epm0_pte_r20_dpg&f=m.

Villas-Boas, S.B. 2007. “Vertical Relationships between Manufacturers and Retailers: Inference with Limited Data.” *The Review of Economic Studies*. 74: 625-652.

Vincent, D.W. 2015. "The Berry-Levinsohn-Pakes Estimator of the Random-Coefficients Logit Demand Model." *The Stata Journal* 15(3): 854-880.

Table 1. Market Shares

Product	Agg. Shares	Obs	Mean	Std. Dev.	Min	Max
Agro Farma	6.5	12	0.541	0.468	0.133	1.632
Breyers	0.022	3	0.007	0.006	0.002	0.014
Cascade	1.237	12	0.103	0.028	0.052	0.169
Danone	20.189	12	1.682	0.719	0.864	2.931
Dean Foods	3.419	12	0.284	0.467	0.014	1.271
Fage USA	0.318	11	0.028	0.013	0.012	0.049
General Mills	47.516	12	3.959	1.644	1.736	7.708
H P Hood	10.534	12	0.877	0.763	0.14	2.735
Healthy Food Holdings	0.02	1	0.02	.	0.02	0.02
Icelandic	0.036	3	0.012	0.006	0.007	0.019
Kalona	0.214	10	0.021	0.014	0.002	0.046
Kraft	0.134	10	0.013	0.012	0.001	0.044
Lala USA	3.209	12	0.267	0.081	0.134	0.444
Liberty Products	0.008	1	0.008		0.008	0.008
Old Home Foods	5.177	12	0.431	0.143	0.243	0.714
Private Label	0.055	3	0.018	0.012	0.011	0.033
Pulmuone	0.004	2	0.002	0	0.002	0.002
Seven Stars Farm	0.011	1	0.011	.	0.011	0.011
Traders Point Farm Organics	0.038	3	0.012	0.003	0.011	0.016
The Hain Celestial	1.049	12	0.087	0.047	0.02	0.183
Turtle Mountain	0.029	2	0.014	0.009	0.008	0.021
Whole Soy	0.027	5	0.005	0.002	0.002	0.008
Wallaby	0.242	9	0.026	0.014	0.009	0.047

Source: IRI

Table 2. Input Prices

Variable	Mean	Std. Dev.	Min	Max
Corn price	6.05	0.641	4.89	7.09
Electricity	7.312	0.25	7.03	7.66
Drymilk price	1.505	0.115	1.253	1.652
Wages	14.53	0.297	14.01	14.92
Gasoline price	3.531	0.266	3.118	3.953

Sources: mentioned in data section

Table 3. Demand Parameter Estimates

		Coef.	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
Mean	Utility						
	Constant	-1.308	2.324	-0.56	0.573	-5.864	3.246
	Organic	2.267	6.711	0.34	0.736	-10.886	15.420
	Price	-1.338	0.747	-1.79	0.073	-2.803	0.126
Organic							
	Children	-1.707	3.630	-0.47	0.638	-8.822	5.407
	SD	0.691	1.845	0.37	0.708	-2.925	4.308
Price							
	Children	-0.112	0.114	-0.98	0.328	-0.337	0.112
	SD	0.504	0.310	1.63	0.104	-0.103	1.112

Table 4. Own - and Cross - Price Elasticities

Product	Agro Farma	Breyers	Cascade	Danone	Danone (Organic)	Dean Foods	Fage USA	General Mills
Agro Farma	**-4.4284**	0.0018	0.0080	0.1408	0.0082	0.0066	0.0132	0.4081
Breyers	0.0558	**-4.4104**	0.0069	0.1295	0.0079	0.0057	0.0091	0.3832
Cascade	0.0378	0.0010	**-4.0423**	0.1146	0.0071	0.0048	0.0061	0.3455
Danone	0.0291	0.0009	0.0050	**-3.5840**	0.0064	0.0042	0.0047	0.3173
Danone (Organic)	0.0289	0.0009	0.0053	0.1099	**-2.3066**	0.0044	0.0046	0.3340
Dean Foods	0.0370	0.0010	0.0056	0.1138	0.0071	**-4.0173**	0.0060	0.3432
Fage USA	0.0829	0.0018	0.0081	0.1416	0.0082	0.0067	**-4.4890**	0.4095
General Mills	0.0268	0.0008	0.0048	0.1008	0.0062	0.0040	0.0043	**-3.2516**
H P Hood	0.0202	0.0007	0.0041	0.0899	0.0054	0.0034	0.0032	0.2781
Kalona	0.0309	0.0009	0.0055	0.1126	0.0812	0.0046	0.0049	0.3410
Lala USA	0.0245	0.0008	0.0046	0.0973	0.0060	0.0038	0.0039	0.2988
Old Home Foods	0.0162	0.0006	0.0036	0.0819	0.0049	0.0031	0.0026	0.2555
Pulmuone	0.1263	0.0025	0.0098	0.1545	0.0339	0.0080	0.0210	0.4309
The Hain Celestial	0.0719	0.0017	0.0076	0.1378	0.0082	0.0063	0.0118	0.4022
Wallaby	0.0507	0.0014	0.0070	0.1333	0.0777	0.0058	0.0082	0.3941
Whole Soy	0.0825	0.0019	0.0087	0.1515	0.0645	0.0072	0.0135	0.4359

Numbers in bold are own-price elasticities

Table 4. (continued)

Product	H P Hood	Kalona	Lala USA	Old Home Foods	Pulmuone	The Hain Celestial	Wallaby	Whole Soy
Agro Farma	0.0232	0.0037	0.0178	0.0095	0.0031	0.0089	0.0045	0.0037
Breyers	0.0233	0.0035	0.0171	0.0101	0.0020	0.0064	0.0038	0.0027
Cascade	0.0224	0.0031	0.0157	0.0101	0.0012	0.0045	0.0030	0.0019
Danone	0.0213	0.0028	0.0146	0.0099	0.0008	0.0035	0.0025	0.0014
Danone (Organic)	0.0220	0.0344	0.0153	0.0100	0.0030	0.0036	0.0245	0.0103
Dean Foods	0.0223	0.0031	0.0156	0.0101	0.0011	0.0044	0.0029	0.0018
Fage USA	0.0231	0.0037	0.0178	0.0094	0.0033	0.0092	0.0046	0.0038
General Mills	0.0210	0.0027	0.0142	0.0098	0.0007	0.0033	0.0023	0.0013
H P Hood	**-3.0529**	0.0023	0.0130	0.0094	0.0005	0.0025	0.0018	0.0009
Kalona	0.0223	**-2.5319**	0.0156	0.0101	0.0032	0.0038	0.0252	0.0109
Lala USA	0.0205	0.0026	**-3.4008**	0.0097	0.0006	0.0030	0.0022	0.0012
Old Home Foods	0.0185	0.0021	0.0120	**-2.6436**	0.0003	0.0021	0.0015	0.0007
Pulmuone	0.0213	0.0157	0.0180	0.0077	**-5.4074**	0.0137	0.0211	0.0166
The Hain Celestial	0.0234	0.0037	0.0177	0.0097	0.0027	**-4.5013**	0.0043	0.0034
Wallaby	0.0238	0.0339	0.0175	0.0101	0.0059	0.0060	**-3.7489**	0.0162
Whole Soy	0.0239	0.0290	0.0188	0.0095	0.0092	0.0094	0.0322	**-4.6839**

Numbers in bold are own-price elasticities