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Demand, Challenges and Marketing Strategies in the Promotion of Local Foods: The Case of Fluid Milk

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Abstract

This paper addresses the demand and challenges for local foods and focuses on the marketing strategies for retail promotion. While federal and state government make efforts to promote local food purchases and consumption at the farm level, local foods face significant distribution challenges in grocers, especially in larger chains. Limited shelf space and high pricing by retailers impede consumers' purchase and result in weak competitiveness for local brands. Therefore, it is essential for local producers and "buy local" programs to understand what types of promotion and marketing strategies might be more effective in stimulating demand in retail outlets. Using 2006-2011 Nielsen Retail Scanner data in the United States, we estimate a random coefficient discrete choice model to determine the effects of nutritional characteristics, price, packaging, and the distribution strategies on the consumers' choice to purchase locally branded milk. We restrict our analysis to the top 7 national brands, top 9 local brands and private labels. Results show even though, on average, consumers prefer less local milk brands than private label brands, income and other unobservable factors significantly influence consumer-specific tastes. Simulations show that a price cut, one-gallon package offering, and expanding distribution channels can significantly stimulate the demand for locally branded milk.

1. Introduction

Over the last decades, there has been steadily growing surge of interest in buying locally produced food and "buying local" has become one of the most important topics in food marketing. Consumers have been increasingly cultivated a sense of local food and there has been huge growth in the number of farm-to-table restaurants and farmers' market (Agricultural Marketing Service, 2016). Further, grocery chains and retailers start to expand and market their locally grown offering for sale as well.

Despite the growing interest in local food, sales remain a small percentage of the value of U.S. agricultural production, around 1.5% in 2012 (Vogel and Low, 2015). Government policies to promote local consumption have become a focus at local, state, and national levels. Many states have implemented some types of local promotional activities, varying from adopting legislations to providing informational materials to promote local products. Some states emphasize creating and managing farmers markets or roadside farm stands (Liang 2015). One common practice is providing support for the development of farmers markets. Georgia and South Carolina offer "Road-side market Incentive Programs" which give the state Department of Agriculture authority to establish standards for the design and operation of these markets. Tennessee focuses on institutional purchasing programs that require state departments and agencies to give preference to locally produced products if they are at least equal in quality and price. Several other states have adopted legislation to provide direct financial incentives to local businesses if they procure local foods. For example, Louisiana adopt legislation designed to encourage restaurants to buy local.

As governments try to promote local food consumption and purchases, most of the programs and initiatives are designed at the farm level, or the direct-marketing channels. However, local food sales also occur through intermediated marketing channels, such as distributors and retailers.

In fact, the majority of the value of local food sales comes from intermediated marketing channels (Low and Vogel, 2011; Vogel and Low, 2015). However, little attention has been given to the challenges faced by local products at the retail level. In particular, marketing challenges are a major concern to the success of local food initiatives. Thus a need exists to understand the specific promotion and marketing strategies to help local producers sell within retail markets.

Grocery stores and retail chains have become increasingly important in selling local food (Smith and Thomassen, 2012; Richards et al, 2017). "Buy local" campaigns by a number of retailers increases the availability of local products, which could further promote the demand for local food. However, it is still a challenge for smaller local brands to get shelf space in a grocery chain or a big-box retailer due to limited bargaining power. Furthermore, local food tends to be more expensive than regional and national brands. Therefore, it is essential for local producers, and retailer "buy local" initiatives to understand what types of promotion and marketing strategies at retail level might be more effective in stimulating demand for local food.

Despite the growing interest in local food, there is still lack of empirical analysis on how to promote local foods. Most existing literature focuses on consumer preference and willingness-to-pay (WTP). Many previous studies find that consumers are willing to pay a positive price premium for local food using either the contingent valuation method with hypothetical survey data ((Brown, 2003; Carpio and Isengildina-Massa, 2009; Darby et al., 2008; Giraud, Bond, and Bond, 2005; Grebitus, Lusk, and Nayga, 2013; Meas at al., 2014) or an experimental auction approach (Akaichi, Gil, and Nayga, 2012; Gracia, de Magistris, and Nayga, 2012). In the milk market, two studies that have approached the issue of local milk focus on proximity to production facility or varying local definitions as opposed to specific branding strategies. With a choice experiment through an online survey of U.S. consumers in 2008, Wolf, Tonsor, and Olynk (2011) find that consumers are willing

to pay about 10 percent more for "locally" branded milk, however, they do not define local, instead leaving it to the subjective definition of the survey taker. Kovalsky and Lusk (2013) also do an online survey to determine the willingness to pay for milk in the Midwest and South. Their research finds that consumers are willing to pay between $0.46 and $1.55 per gallon, depending on how far the milk travels greater than 25 miles from the store, but this does not address questions about branding.

Other studies focus on the sales of local food. Barlagne et al. (2015) find that labels can be used as tools to involve consumers in the development of local food sector. Richards et al (2017) estimate a model of category complementarity and examines retailers' incentives to offer local food. They find that local content essentially softens retail price competition, allowing retailers to earn higher margins and sell greater volumes when local content is emphasized.

This paper addresses the demand and challenges for local foods and focuses on the marketing strategies for promotion at the retail level, which is one of the most important intermediated marketing channels for local food. Using the refrigerated fluid milk market as a case study, we estimate the effects of nutritional factors, pricing, packaging, and the distribution channel on consumers' choices of locally branded milk. Specifically, we estimate a random coefficient discrete choice model using 2006-2011 Nielsen Retail Scanner data in the Northeast United States. We restrict our analysis to the top 7 national brands, top 9 local brands and private labels in the refrigerated milk market. Using the demand estimates, we also conduct three sets of simulations to examine how demand of local milk might be affected by different marketing strategies and firm practices, including: 1) a 10% price cut of local milk; 2) a new package offering; and 3) an expansion of availability in retail chains.

Results show that even though, on average, consumers prefer less local milk than private labels, unobservable factors other than income significantly influence consumer-specific tastes. Our simulation results suggest that all three marketing strategies, a price cut, one-gallon package offering, and expansion of availability in retail chains can significantly stimulate the demand for locally branded milk. Further, new package offering is the most effective, which will increase local food sales by over 71%, followed by expansion of availability in one more retail chain of 62% and 10% price cut of 13%.

The rest of the paper is organized as follows. Section 2 provides a description of the local milk market. Section 3 presents the empirical specification and estimation. Section 4 describes the data used in this paper. Section 5 presents the results and Section 6 concludes.

2. The Local Milk Market

With a relatively limited transportation range and the perishable feature of raw and processed milk, fresh fluid milk has a regional production focus. However, the branding of processed fluid milk most often does not take the dairy farmer label and thus often loses the "local" marketing label. Unlike fruits and vegetables where the harvested product is also a finished consumer product, fresh fluid milk sold in grocery stores must first go through a homogenization and pasteurization process prior to bottling for consumer sale. Thus, the raw milk produced by a dairy farmer is shipped to processing plants, most often via dairy cooperatives like Agri-Mark in the Northeast. The milk is then processed, packaged and labeled with national brands, private label store brands, and local brands (see Figure 1). National brands are products that are labeled with the same brand name regionally or nationally. For example, *Dean Foods*, the leading dairy

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processor in the United States, processes and bottles roughly 70 percent of the northeast regions fresh fluid milk under the name *Garelick Farms* and *Dairy Pure*, even though the milk is produced by local farms. *HP Hood*, another national brand, bottles about 20 percent of the regions fresh fluid milk. Thus, 90 percent of the fluid milk sold in the northeast moves through these two processing companies. Private labels are store brands that are specific to individual stores but collectively are perceived to be a similar product. These are often processed and bottled by major national manufacturers, however, consumers only recognize them by the label listed on the container.

Some of the remaining milk in the northeast region is produced, processed, and distributed by smaller local farms who brand their own finished fluid milk products in the local market. For example, *Farmer's Cow* and *Mountain Dairy* are local brands in Connecticut and *Our Family Farms* and *High Lawn Farm* in Massachusetts. Table 1 summarizes the list of local brands used in this analysis, which covers major local milk brands sold in the northeast region. By branding their own milk, these farms create a connection between the farm and consumers, as well as an opportunity for long term sustainability while also supporting other local businesses (Felson, 2013). However, local brand milk can be priced by retailers at up to 40 percent more than private label milk, which is more comparable to the price of organic milk even though the milk is not organically produced. The high price creates difficulties for local brand milk to compete with national brand and private label milk. Therefore, local brands need to find alternative marketing strategies to stay competitive in the fluid milk market. With the growth of the local food movement, to help achieve the success of the local dairy farms, it is essential to understand consumers' preference for local milk and the types of alternative marketing practices that might be more effective in stimulating consumer demand.

3. Empirical Specification and Estimation

We first analyze the demand of local milk to understand the competition between different fluid milk products. We define a fluid milk product as a combination of its brand, butterfat content and container size. For example, a one-gallon whole milk container of *Hood* and a half-gallon whole milk container of *Hood* are considered two different products. We further classify these milk products into three brand types: national brands, local brands and private label brands.

Following Berry, Levinsohn, and Pakes (1995; hereafter BLP), we assume that consumers choose one milk product among all available alternatives in each market to maximize utility driven by product characteristics as well as the consumer's own characteristics. We use $j=1,...J$ to denote a milk product, and $j=0$ to denote a general outside choice in the beverage market. The total number of milk products in market m is J and there are M markets. Then the indirect utility of consumer i from buying milk product j in market m is given by

$$U_{ijm} = \alpha_i p_{jm} + \beta x_j + \Phi_{1,i} Local_{jm} + \Phi_{2,i} National_{jm} + \Phi_3 Retail\ Availability_{jm}$$

$$+\Phi_4 Gallon_{jm} + \xi_{jm} + \varepsilon_{ijm}, \qquad i = 1, ..., n; j = 0, ..., J; m = 1, ..., M \qquad (1)$$

where p_{jm} is the price of product j in market m and x_j is a vector of product nutrition characteristics, butterfat content, in market m where product j were sold. Specifically, we include four butterfat content categories: whole milk, 2% milk, 1% milk and fat free milk.

$Local_{jm}$ and $National_{jm}$ are dummy variables indicating the brand type of product j in market m. Private label brands are used as a basis. Therefore, $\Phi_{1,i}$ and $\Phi_{2,i}$ are our main interest which are consumer-specific tastes for local brand products and national brand products compared to private labels.

As for container size, we focus on the one-gallon and half-gallon milk which are the most popular container sizes on the market. $Gallon_{jm}$ is a dummy variable that equals to 1 if product j is sold in gallon size container in market m. To capture the availability and easiness of access to a brand, we include $Retail\ Availability_{jm}$ into this analysis. This is measured by the number of grocery stores or chains that sell product j in market m. For example, if a milk brand is only sold in grocery chains *Price Chopper* and *Stop & Shop* in a market, then the retail availability of product j in market m is 2. ξ_{jm} is for unobserved product characteristics and ε_{ijm} is a stochastic term with zero mean and is distributed independently and identically as a Type I extreme value distribution.

To capture the heterogeneity of consumer preference, we use individual-specific coefficients in our model. Further, the consumer-specific taste parameters are decomposed into observed consumer characteristics (D_i) and unobserved consumer characteristics (v_i). We use household income to capture the observable consumer characteristic. The unobservable consumer characteristics are assumed to have a standard multivariate normal distribution:

$$\alpha_i = \alpha + \lambda D_i + \gamma v_i \tag{2}$$

$$\Phi_{1,i} = \Phi_1 + \varphi D_i + \rho v_i \tag{3}$$

$$\Phi_{2,i} = \Phi_2 + \tau D_i + \pi v_i \tag{4}$$

Then the indirect utility can be decomposed into three parts written as

$$U_{ijm} = \delta_{jm} + \mu_{ijm} + \varepsilon_{ijm} \tag{5}$$

where (1) δ_{jm} is the mean utility term and $\delta_{jm} = \alpha p_{jm} + \beta x_j + \Phi_1 Local_{jm} + \Phi_2 National_{jm} + \xi_{jm}$, which is common to all consumes. (2) μ_{ijm} is a brand-specific and consumer-specific deviation from the mean and $\mu_{ijm} = \lambda D_i p_{jm} + \gamma v_i p_{jm} + \varphi D_i Local_{jm} + \rho v_i Local_{jm} +$

$\tau D_i National_{jm} + \pi v_i National_{jm}$, which is the interaction between consumer and product characteristics. (3) ε_{ijm} is the stochastic term with zero mean and is distributed independently and identically as a Type I extreme value distribution.

Therefore, the probability that consumer i choose product j in market m is

$$s_{ijm} = \frac{\exp(\delta_{jm} + \mu_{ijm})}{1 + \sum_{r=1}^{J} \exp(\delta_{rm} + \mu_{irm})}$$

Aggregated over consumers, the market share of product j in market m is corresponding to the probability product j is chosen in market m which is approximated[1] as

$$s_{jm} = \frac{1}{ns} \sum_{i=1}^{ns} \frac{\exp(\delta_{jm} + \mu_{ijm})}{1 + \sum_{r=1}^{J} \exp(\delta_{rm} + \mu_{irm})}$$

Following BLP, we matched the predicted market share with observed shares and solve the model using the generalized moment method.

Price is potentially endogenous since retail-price effects depend on observed and unobserved product and consumer characteristics and variation in these can induce variation in prices. Therefore, two sets of instrumental variables are used to address the potential endogeneity problem of product prices. The first set of instrumental variables are cost shifters, which include raw milk (Class I milk) prices, retail wages, price of electricity, price of plastics. The second set of instrumental variables are Hausman (1994) type instruments, which are prices of the same brand in other markets. The Hausman type instruments are correlated with the price in one market

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[1] See Nevo (2000)

because of common production costs but are uncorrelated with unobservable market-specific demand shocks.

4. The Data

We use the Nielsen Retail Scanner data to collect the fluid milk products' characteristics including price, brand description, fat content, and package size. This dataset includes information from grocery stores, drug stores, mass merchandiser, and other stores with annual sales greater than 2 million dollars. Since local brands usually have limited presence in terms of the geographic scope, we focused on Massachusetts and Connecticut where local brands are sold. Our data sample covers a period from January 1, 2006 to December 31, 2011. We restrict our analysis to the top 7 national brands and top 9 local brands, which account for over 98% of total milk sales in these two states.

In this analysis, a market is defined as a month-county combination. The potential market size is defined for each period and county as population of the county times the combined per capita consumption (in volume) of milk plus other beverages, including water, tea, and fruit juice. The market share for each fluid milk product is calculated as sales volume divided by the potential market size.

Table 2 provides the descriptive statistics of the product characteristics used in this analysis. Retail prices are computed as the sales-weighted average prices for a product sold in a specific market. The average price for all milk is $0.033/oz. Of all milk products available in our sample, 54.8% are national brands, 25.5% are private labels and 19.7% are local brands. Fat content, package size, and the retail availability information are obtained directly from the database. Almost

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half of the products are in one-gallon containers. On average, a milk product is available in 3 retailers.

We further break down our sample by brand type and Table 3 presents the summary statistics of the subsamples. Compared with private labels and national brand milk, local brands have the highest price. This is consistent with findings from previous work. Local brands typically come from small farms that do not enjoy economies of scale and thus face higher costs which are passed along in terms of higher prices. With respect to market shares, private label milk clearly dominates the beverage market with an average share of 49.3%[2] in a market, followed by national brands. Local milk, however, only takes a very small share, which is around 0.7%. As for butterfat content, national brands tend to offer more fat free milk and less whole milk, while local milk brands tend to carry more whole milk. One major difference in product offerings between local milk and their competitors is the container size. Only a small proportion of local milk (28%) are offered in a gallon-size container on the market (see Table 3), while around 50% of private label and national brand milk are offered in a gallon-size container. It is also worth noting that the availability of local milk in retail stores is very limited in a market. On average, a local milk brand is only sold by 1.5 retail stores while a national brand milk is usually carried by 3.4 retail stores in a market. Because we don't distinguish between private label milk from different retailers, there are, on average, 3.3 retailers that carry their own private label milk in a market on average.

Consumer characteristics for Massachusetts and Connecticut are obtained form 2010-2014 American Community Survey from U.S. Bureau of Census. For each market, 100 observations on income are drawn to match the data of milk purchase. The sample average is $8,510 for each

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[2] Following the previous definition of the market size, the market share is defined based on the general refreshment beverage market.

household/month, which is very close to the average from the 2010-2014 American Community Survey.

5. Empirical Results

5.1. Demand Estimation Results

Table 4 represents the estimated demand parameters of local milk. As expected, price has a negative and significant effect on consumers' mean utility with a coefficient of -34.812. The coefficient of the local brand dummy variable is also negative and significant, which indicates that compared to private label milk, consumers generally prefer not to purchase local milk. This result is not surprising and is consistent with the fact that private label milk dominates the fluid milk market and comprised over 49% of total sales in the beverage market, while local milk only captures less than 1%. Further, to capture the potential heterogeneous preference for local milk among households, we also estimated the interaction of local milk with household income. The coefficient of the income heterogeneity for local milk is positive and significant, which suggests that consumers' valuation for local milk increases with their income. In other word, consumers with higher income are more likely to choose local milk over private label milk. In fact, local milk is usually one of the highest priced milk on the shelf. Similarly, although consumers prefer less national brand milk when compared with private label and local milk, their valuation for national brand milk also increases with income.

As for the butterfat content, on average, consumers prefer whole milk and 1% milk to 2% and fat free milk on average. In terms of package size, the one-gallon container is significantly more preferable than the half-gallon container for most consumers. This finding also partially explains

the low market share of local milk. Although consumers prefer to buy a gallon-size milk, many local brands only offer half-gallon containers. Private labels and national brands, on the other hand, provides many more options in packaging: around 50% of private label and national brand milk are offered in a gallon-size container.

The coefficient for retail availability is positive and significant, which implies the availability of a brand is critical in boosting demand. This also presents another challenge faced by local brands. Under the current setup, grocery chains typically charge food companies three types of fees: slotting fees, pay-to-stay fees, and display fee (Economist, 2015; Rivlin, 2016). These fees wind up heavily influencing the selection of products available to consumers and how they are presented. Therefore, it is very difficult for local brands, which are usually smaller brands and manufacturers to make it to the shelf. They also have limited bargaining power and distribution capabilities.

5.2 Simulations of Alternative marketing strategies for local brands.

The estimated parameters in the demand equation allow us to capture how price, local feature, package size, butterfat content and retail availability affect consumers' demand and choices of fluid milk. This section considers the effects of alternative marketing strategies on local milk consumption by simulating the market outcome under different scenarios, over the sample period. Specifically, we conduct the following three sets of simulations to examine how consumers' consumption of local milk might be affected by different marketing strategy and firm practices, which changes the characteristics of milk products in the consumers' utility function:

1) Price cut of local milk: we impose a 10% price cut on local milk.

2) New package offering: we switch all half-gallon containers to one-gallon containers for local milk brand.

3) Expansion in retail availability: we allow local milk to increase its availability by being sold in one additional retailer.

Using the demand estimates, we recalculate the new market shares of all milk products using the changed product characteristics under different scenarios. The results are shown in Tables 5 and 6. In particular, we assessed the percentage changes in market shares of the fluid milk market. These changes translate directly into changes in consumption since the market size of all beverages (the denominator of market shares) remained fixed by design.

Table 5 presents the overall impact on consumption for different milk categories. The price of local milk is generally higher than their private label and national brand counterparts. To examine whether price is the main reason preventing consumers from purchasing local milk, we reduce the prices of local milk brands by 10%, which will bring down the price of local milk to an equivalent level of their competitors. The results suggest that, the 10% price cut will promote the sale of local milk, but only by around 12.95%. On the other hand, the sales of private label milk and national brand milk will be negatively impacted. However, the impact is limited, only 0.047% less for private label milk and 0.035% less for national brand milk.

Column 2 of Table 5 presents the simulation results when switching all half-gallon containers to one-gallon containers for local milk. The consumption of local milk goes up substantially by almost 70% when offer gallon-size milk. This result is expected since, according to our demand estimation results in Table 4, most consumers prefer to buy milk in gallon-size containers. However, only a small proportion of local milk (28%) are offered in gallon-size containers in the market (see Table 3), while around 50% of private label and national brand milk are offered in this

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size. Therefore, it is possible for local milk to see a strong growth in sales if they offer more one-gallon container options. However, it is worth noting that local milk only has a considerably small market share in the fluid milk market, even with a 70% growth in sales. As suggested in Table 3, the market share of local milk in the beverage market is only 0.7%, with 49.5% for private label milk and 10.3% for national brand milk.

The last column of Table 5 shows the simulation results when local milk is offered at an additional retail chain. The demand of local milk increases over 60% with one more outlet. As suggested by the demand estimation in Table 4, the number of outlets contribute positively to consumers' milk choices. However, the distribution channel and availability in stores is limited for local milk compared with private labels and national milk. On average, a local milk brand is only sold by 1.5 retail outlets while a national brand milk is usually carried by 3.4 retail outlets in a market. Therefore, increasing the number of retail outlets to reach a broader market is a promising way for local milk producers to expand their business.

We further break down the impact on local milk consumption by each individual brand and the results are presented in Table 6. Local brands react differently to the alternative marketing strategies. The 10% price cut affects the consumption for High Lawn Farm the most with a 17% increase while the impact is only 9% for Oakhurst. The same thing happens with one-gallon offerings but with greater variance. For several brands, like Guida's, Marcus, Oakhurst and Our Family Farms, one-gallon offering stimulates the demand with a 20%~ 30% increase. This is mainly because these brands have already offered gallon-size milk in their portfolio. However, for other brands, the percent changes will achieve greater than a 90% increase. As for the impact of outlet expansion, the consumption responses are quite similar across different brands, all around 60%. The results indicate that there is a flexibility in local brand marketing decisions. Different

local milk brands can make individual strategies according to their product features, consumer characteristics and market demand reactions.

6. Conclusion

The demand for local products has grown considerably over the last decade. The growing trend of local has drawn much research attention in fruits and vegetables, but little research has been done in the milk sector. This study estimated the demand for locally branded milk incorporating marketing strategies and allowing consumer preferences to be heterogeneous. Specifically, we analyzed effects of price, local brand, nutritional content, packaging size, and distribution strategy on the consumers' choices of milk. Moreover, simulations of alternative marketing strategies are conducted with demand estimation results to examine how local milk consumption might be affected by different scenarios and firm practices,

We find that price negatively affects consumers mean utility and it does not show significant heterogeneity among consumers. Local brands negatively influence the consumers' mean utility compared with private labels. Furthermore, the negative impact diminishes with higher income for the corresponding consumer-specific tastes. As for the fat content, consumers significantly prefer more whole milk and 1% milk than 2% but less fat free milk than 2%. In terms of package size, one -containers are more preferred over half gallon containers for most consumers. The retail availability positively impacts consumer demand.

Price cutting, one-gallon container offerings, and expanding retail availability are marketing strategies that can all boost consumers' consumption for local milk. However, the effect of price cutting is less efficient than the other two with smaller market share changes. Moreover, different

local brands show heterogeneous market demand reactions to these marketing strategies, especially for one-gallon offerings. These findings suggest that even though the most obvious problem faced by local milk is prices that are much higher than private label, direct price cuts do not solve the issue as efficiently as expected. Instead, alternative strategies have greater impact on local milk consumption and are important for local dairies to be competitive in the fluid milk market.

Our findings have broader implications for both food marketing and food policy. From the producers' perspective, we provide alternative strategies to promote local milk at the retail level.

From a policy design, traditional retail channels should not be ignored as opportunities to expand local marketing.

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Table 1. Local Brands in MA and CT markets

Local Brand	Headquarter State
GUIDA'S	CT
MARCUS	CT
THE FARMER'S COW	CT
BYRNE DAIRY	MA
HIGH LAWN FARM	MA
OUR FAMILY FARMS	MA
OAKHURST	ME
AMISH COUNTRY FARMS	NJ
VERMONT FAMILY FARMS	VT

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Price ($/ounce)	0.033	0.008	0.001	0.078
Brands				
National	0.548	0.498	0	1
Private Label	0.255	0.436	0	1
Local	0.197	0.398	0	1
Butterfat Content				
1%	0.238	0.426	0	1
Fat free	0.309	0.462	0	1
Whole	0.228	0.420	0	1
2%	0.224	0.417	0	1
Container Size				
One-Gallon	0.438	0.496	0	1
Half-Gallon	0.562	0.496	0	1
Retail Availability	2.969	2.007	1	9

Table 3. Product Characteristics by Brand Type.

Variable	Mean	Std. Dev.	Min	Max
Price				
Private Label	0.031	0.008	0.016	0.048
Local	0.036	0.007	0.016	0.051
National	0.033	0.008	0.016	0.052
Market Share				
Private Label	0.493	0.651	0.001	4.54
Local	0.007	0.009	0	0.054
National	0.103	0.135	0	1.503
1%				
Private Label	0.254	0.435	0	1
Local	0.233	0.423	0	1
National	0.233	0.423	0	1
2%				
Private Label	0.254	0.435	0	1
Local	0.272	0.445	0	1
National	0.194	0.396	0	1
Fat free				
Private Label	0.238	0.426	0	1
Local	0.207	0.405	0	1
National	0.379	0.485	0	1
Whole Milk				
Private Label	0.254	0.435	0	1
Local	0.288	0.453	0	1
National	0.194	0.396	0	1
Half-Gallon-Size Container				
Private Label	0.508	0.500	0	1
Local	0.720	0.449	0	1
National	0.531	0.499	0	1
One-Gallon-Size Container				
Private Label	0.492	0.500	0	1
Local	0.280	0.449	0	1
National	0.469	0.499	0	1
Retail Availability				
Private Label	3.268	1.990	1	9
Local	1.474	0.918	1	7
National	3.367	2.051	1	9

Table 4. Demand estimation Results.

	Mean Preference		Deviations			
	Mean	Std.Err	Income	Std.Err	Unobservable	Std.Err
Constant	-11.239***	(0.058)	2.881***	(0.197)	1.048	(0.510)
Price	-34.812***	(1.397)	1.043	(0.872)	0.014	(29.634)
Local	-3.793***	(0.026)	0.629**	(0.292)	0.269	(2.827)
National	-4.289***	(0.019)	0.876***	(0.256)	-2.329***	(0.326)
Whole Milk	0.284***	(0.024)				
Fat free Milk	-0.187***	(0.023)				
1%	0.309***	(0.023)				
One-Gallon Size	0.687***	(0.023)				
Retail Availability	0.494***	(0.004)				

Table 5. Simulation Results of Alternative Marketing Strategies

	Percentage Change in Sales		
	Simulation 1: 10% Price Cut (%)	Simulation 2: One-gallon Offering (%)	Simulation 3: Sold by One More Retailer (%)
Local Milk	12.95	71.37	61.93
Private Label Milk	-0.05	-0.27	-0.23
National Brand Milk	-0.03	-0.19	-0.17

Table 6. Simulation Results of Alternative Marketing Strategies for Local Brands

Local Brands	Percentage Change in Sales		
	Simulation 1: 10% Price Cut (%)	Simulation 2: 1-gallon Offering (%)	Simulation 3: Sold by One More Retailer (%)
AMISH COUNTRY FARMS	16.463	97.309	62.969
BYRNE DAIRY	11.075	94.208	62.654
GUIDA'S	11.244	37.534	61.786
HIGH LAWN FARM	17.126	98.065	63.636
MARCUS	10.384	36.308	61.253
OAKHURST	9.487	32.075	62.956
OUR FAMILY FARMS	12.733	29.348	63.587
THE FARMER'S COW	16.141	94.446	61.017
VERMONT FAMILY FARMS	13.443	97.039	62.908

Figure 1. Process of Fluid Milk