Final Project: Garelick Farms

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I.   Objective And Process

The objective of this study is to obtain insight as a brand manager for **Garelick Farms** that can improve the brand's sales and marketing strategy which results in an increase in market share.

To comprehend this, we first did some data research to figure out what the data means, such as running means and frequency to figure out the brand's market share and the dollars they receive on a weekly basis for the various products on their shelf.

We identified the top brands based on the monetary value they generate and the frequency with which they are sold after executing various tests and obtaining market share. We chose the following brands to focus our study on after analyzing the data with SAS and tableau. We chose Garelick Farms because it is a rapidly rising brand that is challenging market giants such as Hood and Deans.

For comparison, we discovered the top selling categories for **Garelick Farms** and did the same for other companies, then used random effects to capture the unbiased effects of the many independent factors on the dollars for the brand at different stores over different weeks.

II. Overview

1. Data Exploration

a. Data Cleaning And Preprocessing

Store information, product revenue and marketing statistics, and product demographics were all included in three different data sets. On the basis of unique id, we merged the store information, product revenue, and marketing information on the basis of IRI KEY, and the combined table and demographics on the basis of UPC.

After that, we cleaned the data by deleting duplicate values and missing values by removing the observation or inputting the mean.

b. T-test & Analysis of Variance

As a marketer, it's critical to know whether your marketing actions are delivering corporate value, therefore after integrating and preprocessing the data, we wanted to evaluate if different ad features, varied display, and different pricing reductions result in different cash amounts. As the p-value for the anova test is less than .05 (as shown below in Figure [1.1]), we can state that different attributes of the variables result in different dollar values.

ANOVA Tests				
	Source	DF	P-value	Significance
Price reduction and Dollars	PR	1	<.0001	Significant
Features and Dollars	F	4	<.0001	Significant
Features and Dollars	D	2	<.0001	Significant

Figure [1.1]

c. Frequency & Means

PROC MEANS was used to determine the amount of units and dollars sold by each brand, which was then sorted to determine the top 10 brands.

A. The top 10 performing brands are: -

L5	Units	Avg. Doll..	Revenue
PRIVATE LABEL	205.04M	$442.2	$90,663.14M
DEANS	5.42M	$78.9	$427.47M
HOOD	5.26M	$140.4	$738.47M
LACTAID 100	5.15M	$35.1	$180.87M
GARELICK FARMS	4.37M	$123.4	$539.61M
NESTLE NESQUIK	4.13M	$19.9	$82.25M
KEMPS	3.91M	$244.4	$956.40M
SILK	3.59M	$32.3	$115.77M
ANDERSON ERIC..	3.27M	$138.2	$452.62M
ROBERTS	2.74M	$118.2	$324.06M

B. Top three performing products within the selected brand

We chose four brands to focus our investigation on similarity based on marketplaces and the various qualities of the milk sold by the companies as we wanted to attain a coherent effect, which gave us the below products: -

No.	UPC	Package	Process	Fat Content	Additives	Type of Milk	Size (OZ)	Dollar Sales
GARELICK FARMS								
1	00-01-75457-08000	PLASTIC CONTAINER	PASTEURIZED HMGNZD	WHOLE	VITAMIN D	REGULAR	128	$1,116,465
2	00-01-75457-17700	PLASTIC JUG	PASTEURIZED HMGNZD	2% MILKFAT	VITAMIN A & D	REDUCED FAT	128	$1,096,865
3	00-01-75457-17000	PLASTIC JUG	PASTEURIZED HMGNZD	1% MILKFAT	VITAMIN A & D	LOWFAT	128	$955,879
HOOD								
1	00-01-44100-10680	PLASTIC JUG	PASTEURIZED HMGNZD	1% MILKFAT	VITAMIN A & D W/CALC	LOWFAT	128	$1,732,884
2	00-02-44100-10652	PLASTIC JUG	PASTEURIZED HMGNZD	2% MILKFAT	VITAMIN A C D W CLCM	REDUCED FAT	128	$1,561,668
3	00-01-44100-10320	PLASTIC JUG	HOMOGENIZED	WHOLE	VIT C D CALCIUM	REGULAR	128	$1,466,599
DEANS								
1	00-01-41900-02779	PLASTIC JUG	PASTEURIZED HMGNZD	FAT FREE	VITAMIN A & D W/CALC	SKIM	128	$1,294,200
2	00-01-41900-02770	PLASTIC JUG	PASTEURIZED HMGNZD	FAT FREE	VITAMIN A & D	SKIM	128	$869,878
3	00-01-41900-02002	PLASTIC JUG	PASTEURIZED HMGNZD	WHOLE	VITAMIN D & CALCIUM	REGULAR	128	$805,644
KEMPS								
1	00-01-41483-00119	PLASTIC JUG	PASTEURIZED HMGNZD	FAT FREE	VITAMIN A & D	SKIM	128	$1,288,266
2	00-01-41483-00122	PLASTIC JUG	PASTEURIZED HMGNZD	2% MILKFAT	VITAMIN A & D	REDUCED FAT	128	$1,245,632
3	00-01-41483-00116	PLASTIC JUG	PASTEURIZED HMGNZD	1% MILKFAT	VITAMIN A & D	LOWFAT	128	$911,316

Figure [1.2]

Garelick farms, Hoods, Kemps, and Deans were the brands that were picked.In order to provide a more granular analysis into the milk market, this report will focus on Garelick Farms and three of its competitors' top three respective performing products with the most dollar sales. As shown above in Figure [1.2], Garelick Farms's top three products across the United States are described as:

1. Plastic container, pasteurized and homogenized, whole fat, white, vitamin D, regular, 128 oz.

2. Plastic jug, pasteurized and homogenized, 2% milkfat, vitamins A & D, reduced fat, 128 oz.

3. Plastic jug, pasteurized and homogenized, 1% milkfat, vitamins A & D, lowfat, 128 oz.

Focusing on Garelick Farms's top performing products will ensure that any data generated by lower performing products which contribute less to dollar sales are not factored into analysis and recommendations to the same degree as each of the firms' more crucial products.

C. Top performing cities (Garelick Farms)

Market Name	Price per Unit	Dollar Sales (M)
Boston, MA	$1.92	$4.13
Providence, RI	$2.04	$1.56
Hartford, CT	$2.06	$1.24
New England	$1.91	$0.79
Pittsfield, MA	$1.95	$0.34
New York, NY	$2.06	$0.28
Syracruse, NY	$1.70	$0.22

Figure [1.3]

According to Figure [1.3], Garelick Farms performs the best in Boston, MA, Providence, RI, and Hartford, CT, with exceptionally large dollar sales in Boston. We would advise Garelick Farms to assess the other brands and products performing successfully within these cities in order to gauge how to grow their market share at a city-level.

Hood: Top Cities	
Market Name	Dollar Sales
Boston, MA	$4,465,401
Hartford, CT	$2,797,555
New England	$2,577,510

Figure [1.4]

As shown above in Figure [1.4], Hood also performs best in Boston, Hartford, and New England, outperforming Garelick Farms. We advise conducting market-specific research for top cities so that Garelick can adjust product offerings to meet market needs accordingly.

III.   Panel data

So, after choosing the brands and categories, we want our study to concentrate on the many elements that influence the dollars generated by the various brands in the various categories. We didn't consider product demographics because UPC is a unique code for each product. We also removed units because they are correlated with variables like price reduction, features, and display because these variables result in an increase or decrease in units, so we created a model of dollars as a function of price reduction, features, and display to capture the effects of these various marketing activities. We used panel data to account for the unobserved heterogeneity.

A. Garelick Farms: Random Effects Model

Garelick Farms – 2% Milk Fat 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.8012	Insignificant
Feature A (FA)	111.2289	10.09	<0.0001	Significant
Feature B (FB)	119.2046	8.69	<0.0001	Significant
Feature C (FC)	108.7365	6.53	<0.0001	Significant
Feature A+ (FA+)	491.8799	13.76	<0.0001	Significant
Major Display (D2)	-36.5784	-0.67	0.5009	Insignificant
Minor Display (D1)	265.3875	5.14	<0.0001	Significant
Price Reduction (PR1)	17.28686	1.65	0.1000	Insignificant

Figure [1.5]

When running the Hausman test on Garelick Farms 2% milk, the test returned an insignificant p-value of 0.8012. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [1.5], Feature A, Feature B, Feature C, Feature A+, and Minor Display tested as significant, with p-values of <0.0001 each. Thus, we can conclude that running Feature A, or a large size advertisement, would increase dollar sales by $111.22 as opposed to not running this feature advertisement. Running feature B, or a medium size advertisement,

would also increase the dollar sales by $119.20 as opposed to not running this feature advertisement. Moreover, running feature C or a small size advertisement would also increase the dollar sales by $108.7, and it can be seen that using a retailer coupon or rebate will also increase the sales by $491.87. Lastly, if minor displays are used, we will again observe an increase in sales by $265.38.

Garelick Farms– Fat Free (Skim) 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.7733	Insignificant
Feature C (FC)	104.7264	10.59	<0.0001	Significant
No Feature FNONE	0	.	.	.
Feature B (FB)	75.8472	9.21	<0.0001	Significant
Feature A (FA)	45.4704	7.02	<0.0001	Significant
Feature A+ (FA+)	133.3403	7.52	<0.0001	Significant
No Display (D0)	0	.	.	.
Minor Display (D1)	186.5645	7.35	<0.0001	Significant
Major Display (D2)	54.9802	2.73	0.0063	Significant
Price Reduction (P1)	11.4035	1.86	0.0633	Insignificant

Figure [1.6]

When running the Hausman test on Garelick Fat Free(Skim) 128oz, the test returned an insignificant p-value of 0.7733. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [1.6], [Feature A, Feature B, Feature C, Feature A+, and Minor Display tested significant with p-values of <0.0001 for each. Major Display also tested significant, with a p-value of 0.0063. Thus, we can conclude that running a small, medium, or

large size advertisement, would increase dollar sales by 104.72,75.84, and 45.47 respectively, as opposed to not running these featured advertisements. Running Feature A+, or the use of retailer coupon or rebate, would also increase the dollar sales by 133.34, as opposed to not running this featured advertisement. Moreover, the use of major and minor displays will also increase the dollar sales by 54.98 and 186.56 respectively.

Garelick – Whole Milk 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.8590	Insignificant
No Feature (FNONE)	0	.	.	
Feature A (FA)	88.822	8.47	<0.0001	Significant
Feature B (FB)	-12.5326	-0.80	0.4254	Insignificant
Feature C (FC)	-100.199	-5.54	<0.0001	Significant
Feature A+ (FA+)	91.9453	1.50	0.1341	Insignificant
No Display (D0)	0	.	.	
Major Display(D2)	-28.4233	-0.73	0.4652	Insignificant
Price Reduction (PR1)	47.4977	4.87	<0.0001	Significant

Figure [1.7]

When running the Hausman test on Garelick Whole Milk 128oz, the test returned an insignificant p-value of 0.8590. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [1.7], Feature A, Feature C, and Price Reduction tested significant with p-values of <0.0001. Thus, we can conclude that running Feature A, or a large size advertisement, would increase dollar sales by $88.82 as opposed to not running this feature advertisement. However, Running Feature B, or a medium size advertisement, would decrease] the dollar sales by $12.53 as opposed to not running this feature advertisement. Moreover, A

price reduction would result in an increase of dollar sales, while a price increase would result in reduced dollar sales.

B. Kemps: Random Effects Model

Kemps – 2% Milk Fat 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9102	Insignificant
Feature A (FA)	-67.6594	-0.24	0.8123	Insignificant
Feature A+ (FA+)	120.1706	0.42	0.6732	Insignificant
No Display Ad (D0)	0	.	.	Insignificant
No Price Reduction (PR0)	0	.	.	Insignificant
Price Reduction (PR1)	-116.773	-1.84	0.0655	Insignificant

Figure [1.8]

When running the Hausman test on Kemps 2% milk, the test returned a insignificant p-value of 0.9102. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [1.8], none of the advertisement features returned significant p-values. Therefore, we are unable to draw assumptions from these data at a 95% level of confidence.

Kemps – Fat-free Milk(Skim) 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9665	Insignificant
Feature A+ (FA+)	-185.831	-0.49	0.6267	Insignificant
Feature A (FA)	-137.997	-0.37	0.7143	Insignificant

Feature B (FB)	-587.1	-0.90	0.3701	Insignificant
No Display Ad (D0)	0	.	.	Insignificant
Price Reduction (PR1)	-332.322	-3.79	0.0002	Significant
RanTwo Test				
Price Reduction (PR1)	-37.9541	-2.52	0.0119	Significant

Figure [1.9]

When running the Hausman test on Fat-free milk, the test returned a insignificant p-value of 0.9665. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [1.9], Price Reduction tested significant with a p-value of 0.0002. Thus, we can conclude that running a Price Reduction for Kemps, would decrease dollar sales by $332.322 as opposed to not doing so. After running the random effects model, the Price Reduction tested significant with a p-value of 0.0119.

Kemps – Whole milk 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9297	Insignificant
No Feature (FNONE)	0	.	.	
No Display (D0)	0	.	.	
No Price Reduction (PR0)	0	.	.	
Price Reduction (PR1)	-106.866	-1.87	0.0624	

Figure [2.1]

When running the Hausman test on Kemps Whole milk, the test returned an insignificant p-value of 0.9297. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.1], none of the advertisement features returned significant p-values. Therefore, we are unable to draw assumptions from these data at a 95% level of confidence.

C. Deans: Random Effects Model

Deans – 2% Milk Fat 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.5484	Insignificant
No Feature (FNONE)	0	.	.	
Feature A (FA)	712.2222	15.95	<0.0001	Significant
Feature B (FB)	33.2606	0.32	0.7519	Insignificant
No Display (D0)	0	.	.	
Price Reduction (PR1)	-12.8899	-0.41	0.6830	Insignificant

Figure [2.2]

When running the Hausman test on Deans 2% Milk Fat 128oz, the test returned an insignificant p-value of 0.5484. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.2], only feature A tested significant with a p-value of <0.0001. Thus, we can conclude that running Feature A, or a large size advertisement, would increase the dollar sales by $712.22 as opposed to not running this feature advertisement.

Deans – Fat-free Milk(Skim) 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.5484	Insignificant
No Feature (FNONE)	0	.	.	.
Feature A (FA)	712.222	15.95	<0.0001	Significant
Feature B (FB)	33.2606	0.32	0.7519	Insignificant
No Display (D0)	0	.	.	.
Price Reduction (PR1)	-12.8899	-0.41	0.6830	Insignificant

Figure [2.3]

When running the Hausman test on Deans Fat Free Milk (Skim) 128oz, the test returned an insignificant p-value of 0.5484. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.3], only feature A tested significant with a p-value of <0.0001. Thus, we can conclude that running Feature A, or a large size advertisement, would increase the dollar sales by $712.22 as opposed to not running this feature advertisement.

Deans – Whole Milk 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9589	Insignificant
No Feature (FNONE)	0	.	.	.
Feature A (FA)	482.677	2515	<0.0001	Significant
Feature B (FB)	13.2156	0.31	0.7544	Insignificant
No Display (D0)	0	.	.	.
Price Reduction (PR1)	-3.1782	-0.26	0.7926	Insignificant

Figure [2.4]

When running the Hausman test on Deans Whole Milk 128oz, the test returned an insignificant p-value of 0.9589. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.4], Feature A tested significant with a p-value of <0.0001. Thus, we can conclude that running Feature A, or a large size advertisement, would increase dollar sales by 482.67 as opposed to not running this feature advertisement.

D. *Hood: Random Effects Model*

Hoods – Fat Free 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance

			0.4952	Insignificant
Hausman test			0.4952	Insignificant
No Feature (FNONE)	0	.	.	.
Feature A (FA)	87.6428	8.64	<0.0001	Significant
Feature B (FB)	59.5366	6.41	<0.0001	Significant
Feature C (FC)	84.0637	4.06	<0.0001	Significant
No Display (D0)	0	.	.	.
RanTwo Test				
Major Display (D2)	-17.2117	-0.29	0.7729	Insignificant
Price Reduction (PR1)	20.8554	2.53	0.015	Significant

<div align="center">Figure [2.5]</div>

When running the Hausman test on Hoods 2% Fat Free 128oz, the test returned an insignificant p-value of 0.4952. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.5], Feature A, Feature B, Feature C, and Minor Display tested significant with p-values of <0.0001 each. Thus, we can conclude that running a small, medium or large size advertisement, would increase the dollar sales by 84.06,59.53, and 87.64 respectively, as opposed to not running these featured advertisements. Moreover, it can be seen that using the minor display will also increase the dollar sale value by 256.233. Lastly, after running the RanTwo test, we can also conclude that reducing the price will also have a positive effect on the dollar sales by 20.855.

Hoods – 2% Milk Fat 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9120	Insignificant
No Feature (FNONE)	0	.	.	.
Feature A (FA)	-67.6594	-0.24	0.8123	Insignificant
Feature A+ (FA+)	120.4706	0.42	0.6732	Insignificant
No Display (D0)	0	.	.	.

Price Reduction (PR1)	-116.773	-1.84	0.0655	Insignificant

Figure [2.6]

When running the Hausman test on Hoods 2% Milk Fat 128oz, the test returned an insignificant p-value of 0.9120. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.6], Feature A and Feature A+, both tested insignificant with a p-value of 0.8123 and 0.6732. Thus, we can conclude that running a large size advertisement, or using a retailer coupon or rebate would have no effect on the dollar sales. Likewise, reducing the price will also have no effect on the dollar sales amount.

Hoods – Whole Milk 128oz				
Dependent Variable: Dollar Sales				
Variable	Estimate	t-value	p-value	Significance
Hausman test			0.9898	Insignificant
No Feature (FNONE)	0	.	.	.
Feature A (FA)	199.8523	5.15	<0.0001	Significant
Feature B (FB)	-72.2625	-4.34	<0.0001	Significant
Feature C (FC)	-54.8785	-1.99	<0.0466	Significant
Major Display (D2)	298.4074	2.35	0.0190	Significant
RanTwo Test				
Price Reduction (PR1)	11.4269	0.90	0.3683	Insignificant

Figure [2.7]

When running the Hausman test on Hoods Whole Milk 128oz, the test returned an insignificant p-value of 0.9898. Because this p-value is insignificant, we are unable to reject the null hypothesis that the independent variables and error terms have no correlation. Thus, we will be using the random effects model.

As shown above in Figure [2.7], Feature A, Feature B, and Feature C tested as significant with p-values of <0.0001 each. Major Display also tested as significant with a p-value of 0.0190. Thus, we can conclude that running a small or medium size advertisement, would decrease the dollar sales by 54.87 and 72.26 respectively, as opposed to not running these

featured advertisements. However, using a large size advertisement will result in an increase in dollar sales by 199.85. Moreover, it can be seen that using the major display will also increase the dollar sale value by 298.40 and after running the RanTwo test, we can conclude that reducing the price will have no effect on the dollar sales.

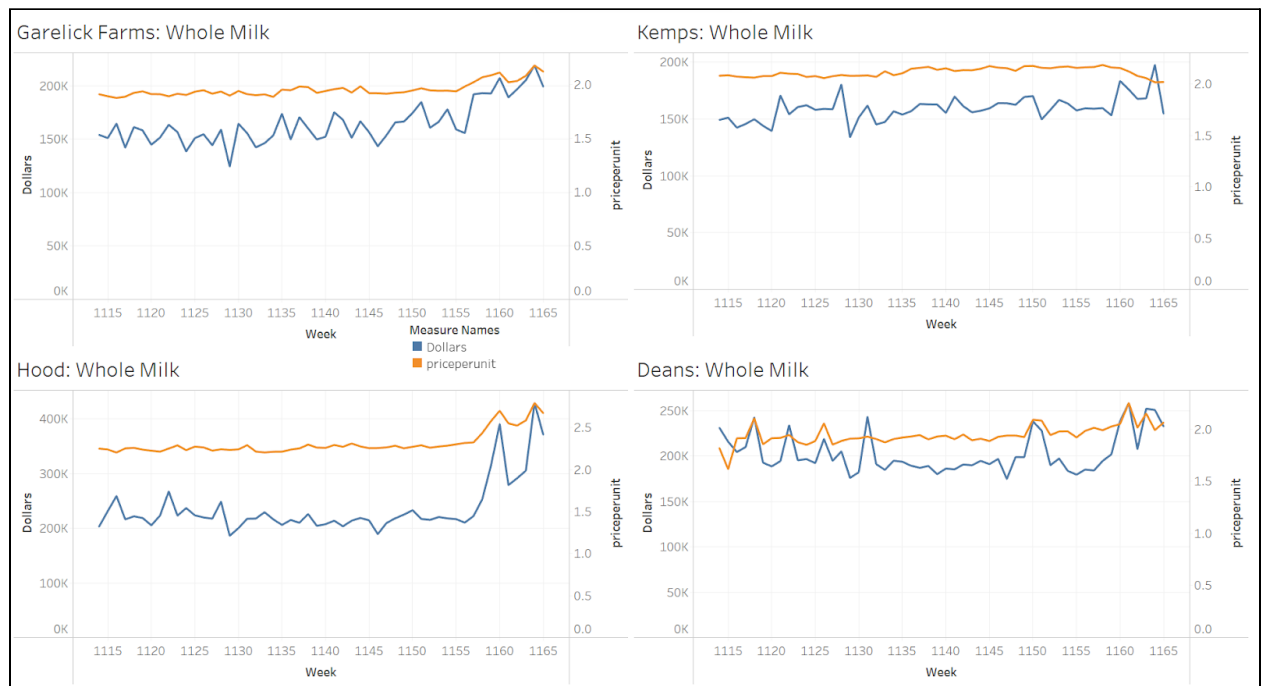## IV.   Insights & Recommendations

Figure [2.8]

The orange line shows us the average price per unit of all the four brands and the blue line shows us the total dollars spent for that brand.

As for advertising expenses and methods, the panel data tests ran for the 2%, fat-free, and whole milk products reflect that small, medium, large, and coupons/rebates had a statistically significant impact on dollar sales. Based on market research, we know Garelick Farms is doing well in the 2 percent milkfat, whole, and fat free product categories, particularly in the 64oz and 128oz sizes. We compete directly with the Hoods in Boston, so we should benefit from the analysis. One noteworthy conclusion is that when displaying products in major displays, both Hoods and Garelick farms have a negligible effect. We should concentrate on minor displays because we can restrain our budget there and invest in feature A+ because it has the greatest influence on dollars.

Based on our findings, we advise Garelick Farms to run the above statistically significant ad campaigns and especially focus them within the cities of Boston, Providence, and Hartford, and to directly compare themselves with Hood within the ad messaging, as Hood is a direct competitor with Garelick Farms within these cities.

Another point to consider is that price reduction is an effective method, therefore we should continue to focus on it as it will help not only with cash values, but also with increasing the client base, and if recouped with a good product, we can have long-term consumers.

Considering Lactaid 100, which generates significant revenue just from lactose-free products, Garelick Foundation can strategize a new product offering to enter a new category and expand its customer base.

Our advice is for Garelick Farms to focus on the three categories listed above. We should shield our market base with a+ feature and modest display, with price reductions to deal with uncertainty, when new firms emerge. We can also look at alternative product categories to broaden our range and client base.