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| Fall 2023 |

**HOMEWORK EXERCISE 4**

**This exercise is to be submitted to Canvas by 3:30 PM on Tuesday November 14, 2023. Please submit your answers in an Excel file with the following naming convention:**

**“last\_first\_hw4” (for example, sonnier\_garrett\_hw4)**

**Your submission file should be neatly formatted and contain five tabs, one for each question.**

**This is an individual homework assignment but you may confer with your classmates.**

**Market Response Modeling at Goodbelly Beverages**

Goodbelly is a line of probiotic juice products produced by Colorado based Next Foods, Inc. The product was launched in January of 2008 and is available nationwide at retailers such as Whole Foods Market and Safeway, Inc. In May-July of 2010 the firm spent money on in store product demonstrations in select Whole Foods regions. Goodbelly is trying to understand what, if any, impact the in store demonstrations might have had on sales and profitability.

To help address these questions we have data from the Rocky Mountain (RM) and Northeast Regions (NE). The data include units sold, retail price, a dummy code for demo (which is a 1 if the demo occurred in a particular store within each regain in a particular week) and a dummy code for demo1-3 which is a 1 if a store had a demo 1, 2 or 3 weeks ago.

Using the data file goodbelly\_data.xls estimate models to answer the following questions. For the purposes of this homework you may leave the sales and price data in levels.

1. Estimate sales response models for the RM and NE regions separately. For your models specify sales as a linear function of price, demo and demo1-3. What are your conclusions about the effect of price on sales? What are your conclusions about the effect of the demos on sales?
2. Estimate a model that pools the RM and NE regions into a single model with a common intercept, price coefficient, demo coefficient and demo1-3 coefficient. What are your conclusions about the effect of price on sales? What are your conclusions about the effect of the demos on sales?
3. Provide statistical guidance on whether or not the price coefficient and demo/demo1-3 coefficients are statistically different across regions. (HINT: go back to the segmentation lecture where we examined how to test for statistically significant differences across customer satisfaction segments). You might examine models that allow for 1) different intercepts only, 2) different intercepts and price coefficients, 3) different intercepts and demo/demo1-3 coefficients, and 4) different intercept, price and demo/demo1-3 coefficients.
4. Based on your findings in 3), choose a model and use it to test for an effect of running demos in all stores in the RM and NE markets for the week of July 20,2010. Your model should include any dynamic effects of the demonstrations you estimate to be present in the data. To focus on the demos assume the retail price in each store will remain at July 13, 2010 weekly prices for the week of July 20 and any subsequent weeks relevant to your analysis. What is the predicted sales for each store and week? Assuming retail % margins of 30% and manufacturer % margins of 50% (constant across regions, stores and weeks) what are the expected profits for Goodbelly? Report these for each store and week and report the aggregate across all stores and weeks.
5. How important are dynamic demo effect in the weeks subsequent to a promotion? How much lower would your aggregate profit estimates in 4) be without the dynamic effects?