**Objective**

Analyze sales data from Goodbelly Beverages to evaluate the impact of in-store demonstrations and pricing strategies on sales and profitability. The analysis will use data from the Rocky Mountain (RM) and Northeast (NE) regions, with sales response models to address the following questions.

**Tasks**

1. **Sales Response Models by Region**
   * Estimate sales response models separately for the RM and NE regions.
   * Use a linear function of sales with price, demo (current week), and demo effects from the previous 1-3 weeks (demo1-3).
   * Assess the effect of price and demonstrations on sales.
2. **Pooled Sales Response Model**
   * Estimate a single sales response model pooling RM and NE regions with common intercept, price coefficient, and demo/demo1-3 coefficients.
   * Compare the pooled model results to the regional models.
3. **Statistical Comparison of Coefficients Across Regions**
   * Test whether the price and demo/demo1-3 coefficients differ statistically across regions.
   * Evaluate models allowing for:
     1. Different intercepts only.
     2. Different intercepts and price coefficients.
     3. Different intercepts and demo/demo1-3 coefficients.
     4. Different intercepts, price coefficients, and demo/demo1-3 coefficients.
4. **Impact of Demos in All Stores (Week of July 20, 2010)**
   * Use the chosen model to predict sales if demos were run in all stores in RM and NE for the week of July 20, 2010.
   * Assume July 13, 2010 prices remain constant for this analysis.
   * Calculate predicted sales, margins (30% retail, 50% manufacturer), and profits for each store and week.
   * Report aggregate profits across stores and weeks.
5. **Importance of Dynamic Demo Effects**
   * Evaluate the significance of dynamic demo effects in subsequent weeks.
   * Calculate the reduction in aggregate profit estimates if dynamic effects are excluded from the analysis.