Project: Analyzing a Market Test

Step 1: Plan Your Analysis

Answer the following questions to help you plan out your analysis:

1. What is the performance metric you'll use to evaluate the results of your test?
    - The management of Round Roasters wants to improve the growth of their coffee chain by introducing gourmet sandwiches to the menu, along with limited wine offerings. Also in order to drive traffic to the stores, a television advertisement campaign will be run which will result in significant boost in the company's market budget. In order to minimize the risk, an A/B test will be carried out in selected stores in 2 cities to help predict if implementing the new change in all stores will be profitable.
    - The performance metric that will be used is that the predicted impact to profitability should be enough to justify the increased marketing budget: at least **18% increase in profit growth (gross margin)** compared to the comparative period while compared to the control stores.
    - In order to carry out this analysis, the data that will be used include, transaction data for all stores, a list of round roaster stores and a list of selected stores to be used as the test market.

2. What is the test period?
    - The test period is to run for 12weeks from 29th of April, 2016 – 21st of July, 2016.
3. At what level (day, week, month, etc.) should the data be aggregated?
    - Since the experiment will run for 12weeks, the data will be aggregated at week level.

Step 2: Clean Up Your Data

In this step, you should prepare the data for steps 3 and 4. You should aggregate the transaction data to the appropriate level and filter on the appropriate data ranges. You can assume that there is no missing, incomplete, duplicate, or dirty data. You're ready to move on to the next step when you have weekly transaction data for all stores.

Step 3: Match Treatment and Control Units

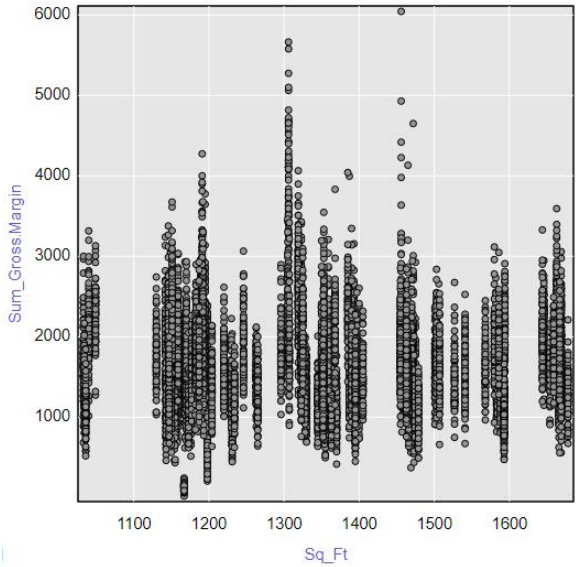
In this step, you should create the trend and seasonality variables, and use them along with you other control variable(s) to match two control units to each treatment unit. Note: Calculate the number of transactions per store per week to calculate trend and seasonality.

Apart from trend and seasonality...

1. What control variables should be considered? Note: Only consider variables in the RoundRoastersStore file.
    - Sq_Ft
    - AvgMonthSales

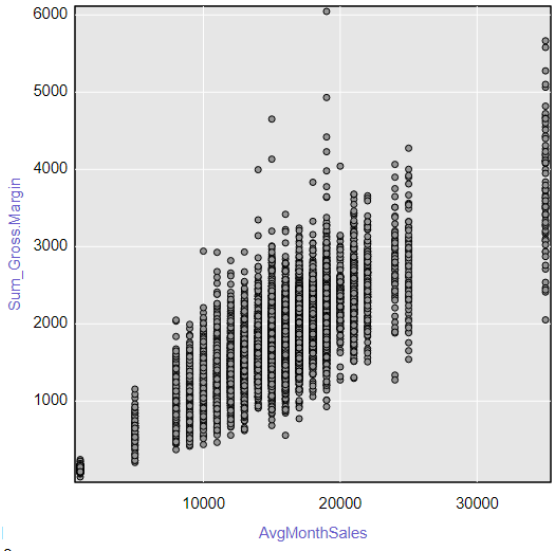
2. What is the correlation between your each potential control variable and your performance metric?
    - My performance metric is gross margin and the correlation between gross margin and two potential control variables(Sq_Ft and AvgMonthSales) is as shown below;

    - Gross margin vs Sq_Ft:



The image above shows that there is a low correlation of -0.02 between the gross margin and the Sq_Ft variable which makes Sq_Ft not a suitable numeric variable to be used.

    - Gross margin vs AvgMonthSales:



- The image above shows that there is a fairly high correlation of 0.79 between the gross margin and the AvgMonthSales variable which makes AvgMonthSales a more suitable numeric variable to be used.
  The Correlation report is as shown below;

Pearson Correlation Analysis

Full Correlation Matrix

	Sum_Gross.Margin	Sq_Ft	AvgMonthSales
Sum_Gross.Margin	1.000000	-0.019345	0.790358
Sq_Ft	-0.019345	1.000000	-0.046967
AvgMonthSales	0.790358	-0.046967	1.000000

Matrix of Corresponding p-values

	Sum_Gross.Margin	Sq_Ft	AvgMonthSales
Sum_Gross.Margin		5.1796e-02	0.0000e+00
Sq_Ft	5.1796e-02		2.3119e-06
AvgMonthSales	0.0000e+00	2.3119e-06	

3. What control variables will you use to match treatment and control stores?
   - Trend
   - Seasonality
   - AvgMonthSales

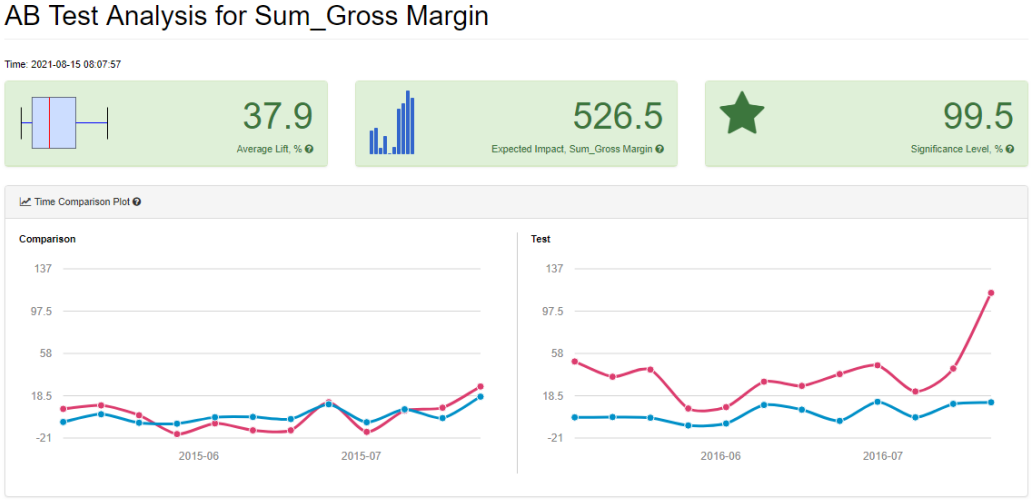
4. Please fill out the table below with your treatment and control stores pairs:

Treatment Store	Control Store 1	Control Store 2
1664	7162	8112
1675	1580	1807
1696	1964	1863
1700	2014	1630
1712	8162	7434
2288	9081	2568
2293	12219	9524
2301	3102	9238
2322	2409	3235
2341	12536	2383

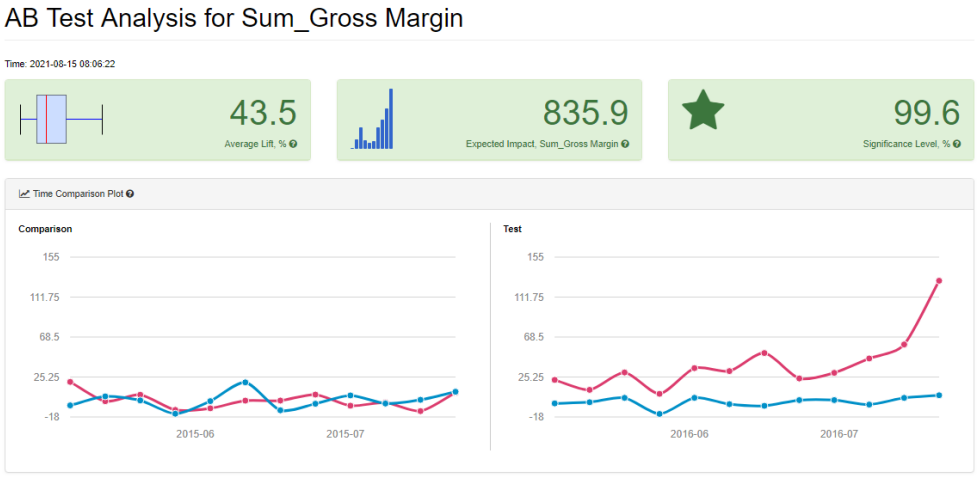
Step 4: Analysis and Writeup

Answer these questions. Be sure to include visualizations from your analysis:

1. What is your recommendation - Should the company roll out the updated menu to all stores?
    - My recommendation is that the company should roll out the updated menu to all stores because the test carried out across the test stores shows a significant improvement in the gross margin expected.
2. What is the lift from the new menu for West and Central regions (include statistical significance)?
    - **West region:**
      The lift as a result of the new menu in the new stores compared to the control stores in the West region is projected to be 37.9% which is higher than the desired 18% improvement. The significance level of the result is at 99.5% as shown in the result below;



    - **Central Region:**
      The lift as a result of the new menu in the new stores compared to the control stores in the Central region is projected to be 43.5% which is also higher than the desired 18% improvement. The significance level of the result is at 99.6% as shown in the result below;



3. What is the lift from the new menu overall?
    - **Overall:**
      West region: The lift as a result of the new menu in the new stores compared to the control stores overall is projected to be 40.7% improvement in weekly gross margin which is significantly higher than the desired 18% improvement. The significance level of the result is at 100%. This is a very optimistic result which suggests that the proposed change will prove to be profitable and also help to improve and reignite the growth in the stores. The result of the analysis is as shown below;