Project: Analyzing a Market Test

An upscale coffee chain in the USA is trying to increase growth by introducing a new menu to some select stores in Chicago and Denver. These stores were chosen as they perform similar to other stores across the chain.

The test ran for a period of 12 weeks (2016-April-29 to 2016-July-21) where five stores in each of the test markets offered the updated menu along with television advertising.

You've been asked to conduct an A/B analysis of the results to determine whether the menu changes should be applied to all stores. The predicted impact to profitability should be enough to justify the increased marketing budget: at least 18% increase in profit growth compared to the comparative period while compared to the control stores.

Plan Your Analysis

1. *What is the performance metric you'll use to evaluate the results of your test?*

   Incremental lift represented by gross_margin in the data.

2. *What is the test period?*

   The test ran for 12 weeks between 2016-April-29 to 2016-July-21.

3. *At what level (day, week, month, etc.) should the data be aggregated?*

   The data should be aggregated per week.
   We need 52 weeks of historical data (which we have), 12 weeks of trend analysis data (one year previous) and the 12 week test. Therefore we need 76 weeks for analysis.

   Data required for 76 weeks runs from 6-2-2015 to 21-07-2016.

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.

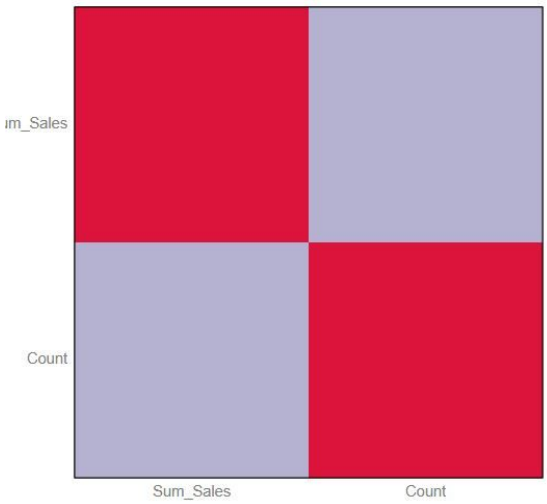
Step 3: Match Treatment and Control Units

Apart from trend and seasonality...

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

   Sq_ft, Average Sales per month per store

2. *What is the correlation between your each potential control variable and your performance metric?*



The correlation between count and the sum of sales per store per month has a coefficient of -0.4. This is evidence that sales should be controlled since sales is related to the number of products sold at stores.

The coefficient for Sq_ft is -0.05 so there is no correlation.

3. *What control variables will you use to match treatment and control stores?*

   Average Sales per month per store

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

1. *What is your recommendation - Should the company roll out the updated menu to all stores?*

   I would recommend the updated menu roll out to all stores. The combined lift was *40.7%* at a significance level of 100%. This is above the 18% required to justify the increased marketing budget. The central region had a higher increase than the west region.

2. *What is the lift from the new menu for West and Central regions? (include statistical significance)*

   Lift for West region:
   The weekly revenue would increase by $527.

Lift Analysis for Weekly gross margin

Lift	Expected Impact	Significance Level
37.9%	527	99.5%

Summary Statistics for Weekly gross margin by Test Group

Statistic	Treatment	Control
Average	39.17	1.92
Minimum	12.34	-13.96
Maximum	55.30	19.70
Standard Deviation	16.34	11.24

   Lift for Central region:
   The weekly revenue would also increase by $836.

Lift Analysis for Weekly gross margin

Lift	Expected Impact	Significance Level
43.5%	836	99.6%

Summary Statistics for Weekly gross margin by Test Group

Statistic	Treatment	Control
Average	39.74	-1.73
Minimum	20.09	-16.18
Maximum	67.52	17.29
Standard Deviation	17.15	10.03

3. What is the lift from the new menu overall?

   Lift for new menu overall:

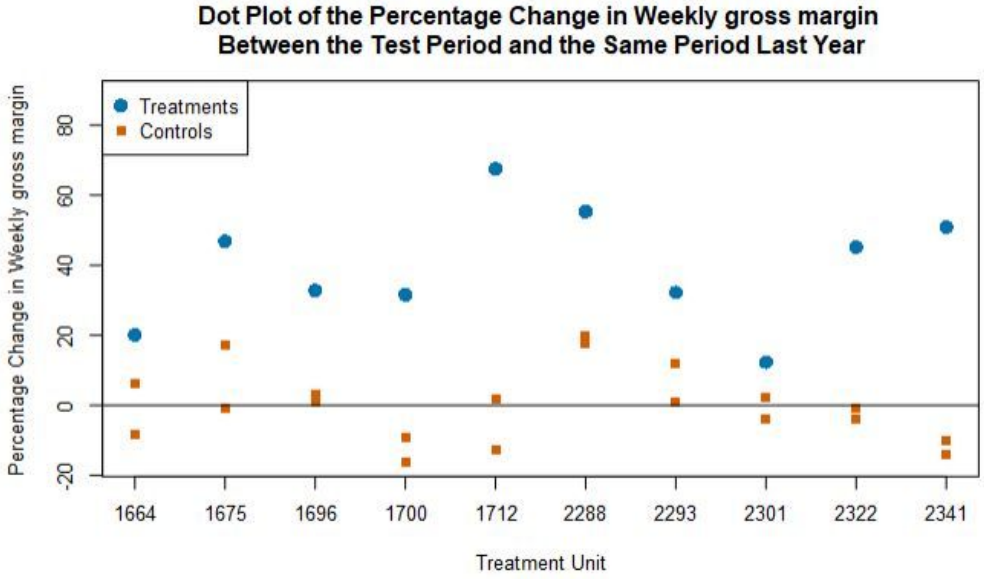
Lift Analysis for Weekly gross margin

Lift	Expected Impact	Significance Level
40.7%	681	100.0%

Summary Statistics for Weekly gross margin by Test Group

Statistic	Treatment	Control
Average	39.45	0.09
Minimum	12.34	-16.18
Maximum	67.52	19.70
Standard Deviation	16.30	10.54

Nearly all the treatment stores are above the control stores showing that a roll out will be positive to most stores.



The box and whisker plots show the increase in and change from the test period to the same period the previous year.