

## **Project5: A/B Testing**

### **Analyzing a Market Test**

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## **Step 1: Plan Your Analysis**

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

Answer:

From the project overview, since we are predicting to make profit, the performance metric to use is the Gross Margin

What is the test period?

Answer:

The test period is 12weeks starts from 2016-April-29 and ends 2016-July-21

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

Answer:

The data should be aggregated at weekly level.

## **Step 2: Clean Up Your Data**

Consequently, I have determined data with important fields, and there is no dirty, missing, duplicate, or incomplete data. I have fixed some issues that would aid in preparing data for analysis.

- In Round Roasters transaction file, the Invoice\_Date, Gross margin, invoice number and Sales were checked and converted to their appropriate data types.
- Store sale transaction was filtered to maintain transaction with dates between 2015-February-06 to 2016-July-21, total of 76weeks.
- I have aggregated the store sales transactions by each week for each store.
- I have listed all stores and determined whether a store is a treatment store or not, by using the treatment store.csv file.
- I joined store list with round roaster.csv file before adding the AvgMonthSales field.

## **Step 3: Match Treatment and Control Units**

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

Answer:

Average monthly sales and area square feet should be considered.

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

Answer:

Looking at the correlation matrix from Figure1, it shows that Average Monthly Sales strongly affect the Gross Margin, while square feet area does not. Therefore, I'll choose Average Monthly Sales also trend and seasonality.

### 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	

Figure1: Pearson Correlation Analysis

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

Answer:

I'll use Average Monthly Sales, trends and seasonality as my control variables.

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

Treatment Store	Control Store 1	Control Store 2
1664	7162	1542
1675	1580	1807
1696	1964	1863
1700	2014	1630
1712	8162	7434
2288	9081	2568
2293	12219	9589
2201	3102	2383
2322	2409	9388
2341	2572	12536

## Step 4: Analysis and Writeup

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

Answer:

Yes, I recommend that the company should roll out the updated menu to all stores, since we are predicting to make profit. The AB Test analysis sum gross margin which is a comparison of the treatment control pairs clearly prove that there is an average lift in Sum Gross Margin of 37.1% for the treatment unit over the control unit and a positive outcome in an expected impact of 631.3 with a significance level of 100%.

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

Answer:

The lift for Central regions is 41% with a significance of level of 99.5% while the lift for West region is 33.2% and with a significance level of 99.4%.

### AB Test Analysis for Sum\_Gross Margin

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Figure2: Central Region Gross Margin

### AB Test Analysis for Sum\_Gross Margin

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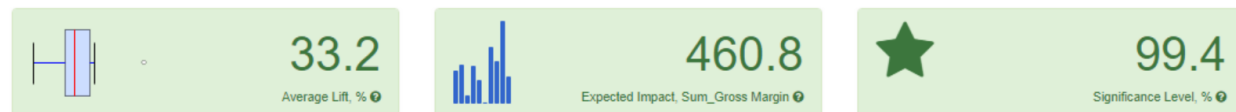


Figure3: West Region Gross Margin

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

Answer:

From the new menu, the overall lift is 37.1% with significance level of 100%.

### AB Test Analysis for Sum\_Gross Margin

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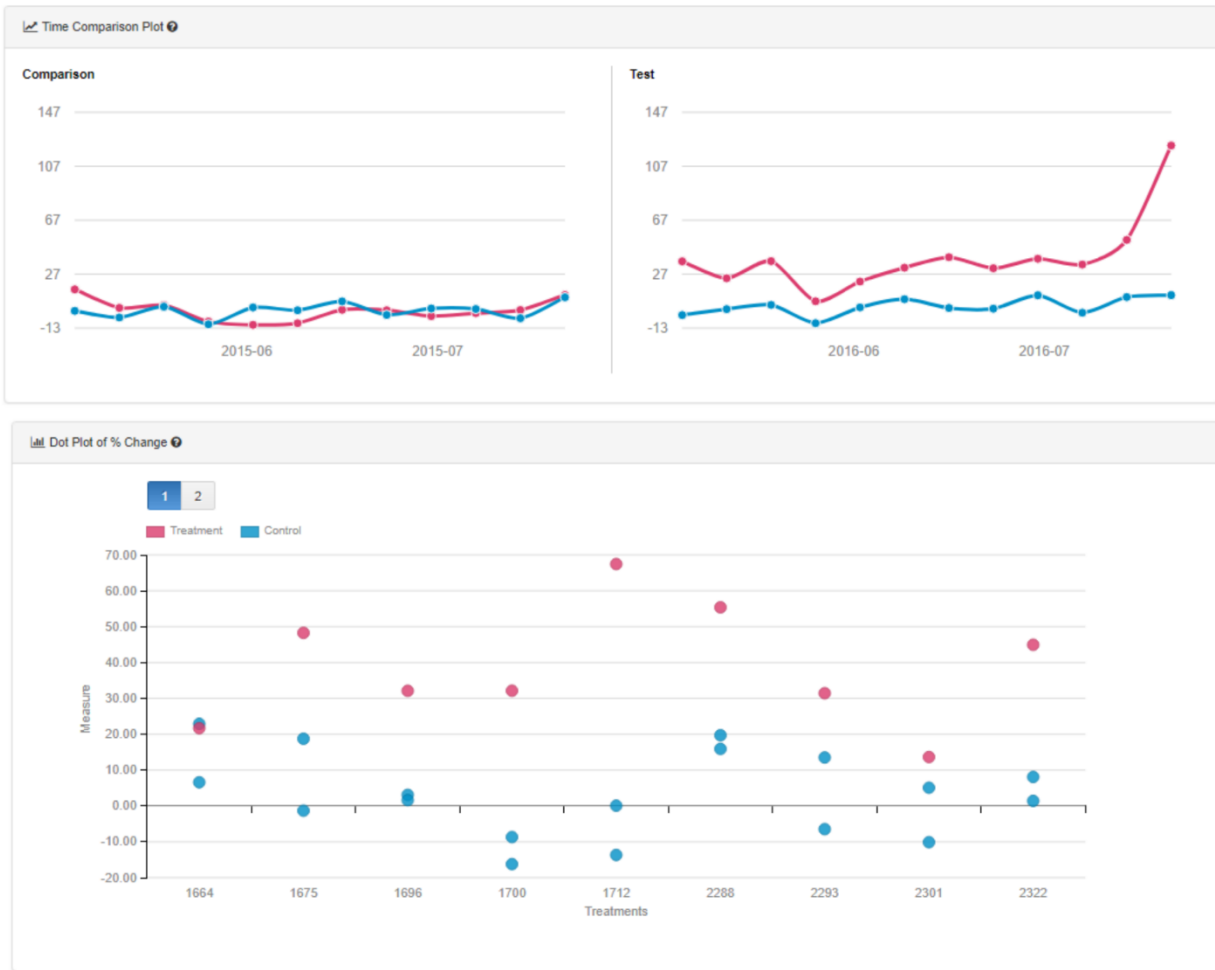
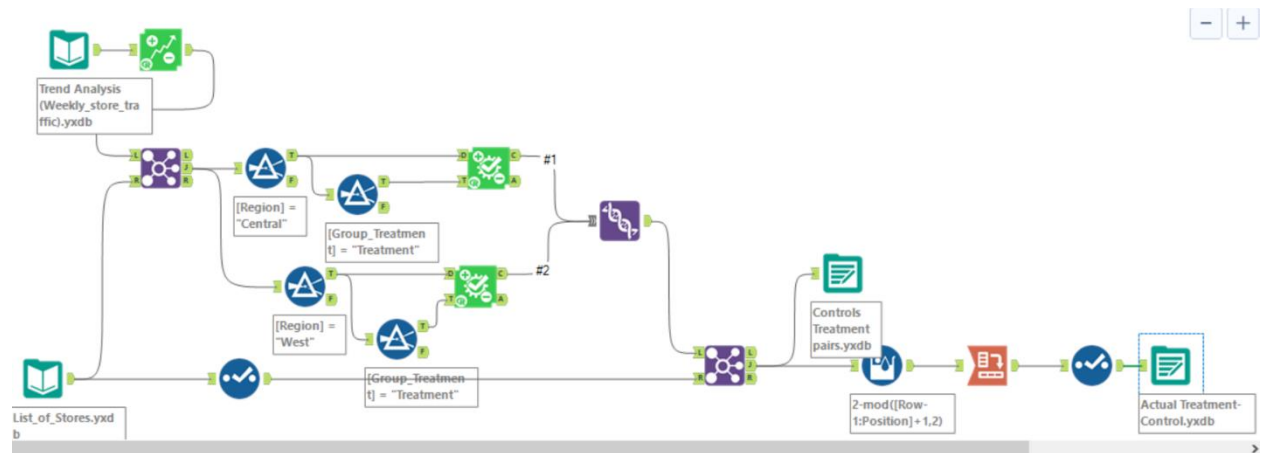
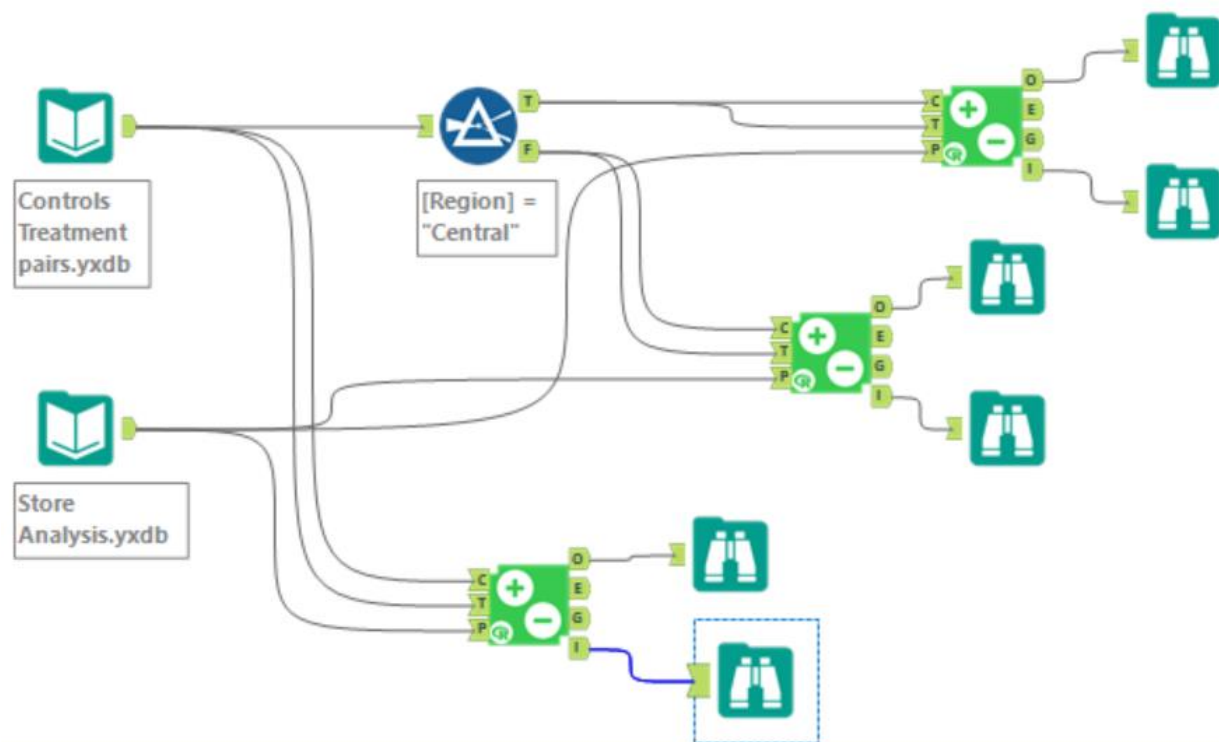


Figure4: Overall Gross Margin, Time Comparison and Dot Plot.



Alteryx Workflow for Match Treatment-Control Pairs



Alteryx Workflow for AB Analysis.