Analyzing a Market Test

Project Overview

At Round Roasters, a coffee restaurant in the United States of America. The executive team conducted a market test with a new menu and needs to figure whether the new menu can drive enough sales to offset the cost of marketing of the new menu. They need to analyse the A/B test and get a recommendation to whether the Round Roasters chain should launch this new menu.

Skills Required

- Cleanup, format, and blend a wide range of data sources
- Plan and analyze A/B tests

Analysis

The performance metric will be the growth in profit yielded from the 10 test stores compared to control stores in the same period by Using the resulted sum of gross margin for these stores.

The test period will be 12 weeks from 29-April-2016 until 21-July-2016. And the data should be aggregated at a weekly level.

Matching Treatment and Control Units

Control variables to be considered:

Considering numeric variables on the Round_Roasters_Store file, the variables will be **Sq_ft** and **AvgMonthSales** but after studying the correlations only AvgMonthSales will be considered as a control variable.

The correlation between control variable and performance metric:

The performance metric will be the sum of gross margin of all the stores.

Pearson Correlation Analysis

Focused Analysis on Field Sum_Sum_Gross.Margin

	Association Measure	p-value	
AvgMonthSales	0.790358	0.000000	***
Sq_Ft	-0.019345	0.051796	.

Full Correlation Matrix

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

And the result of Pearson correlation analysis shows that there is a high correlation between our target variable the Sum of Gross margin and the Average monthly sales with a value of 0.79 and a high significance.

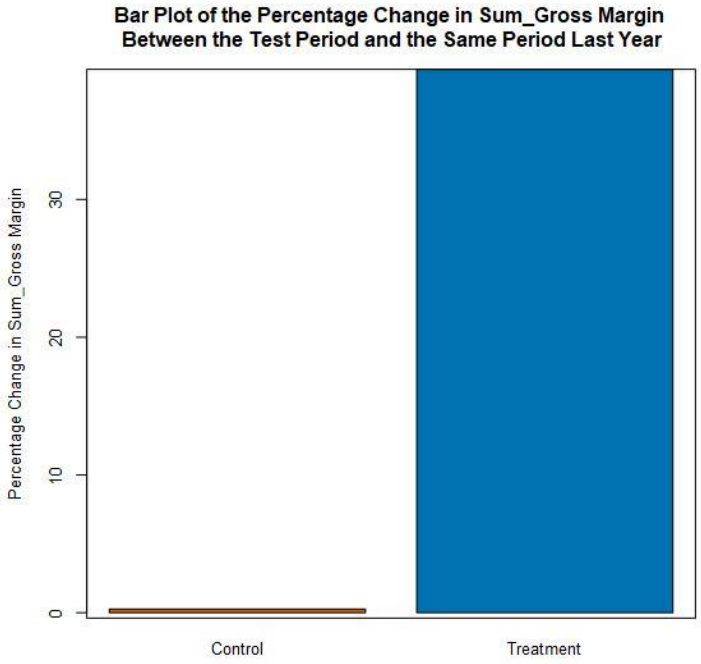
The **AvgMonthlySales**, Trend and Seasonality will be used to match two control units to each treatment unit.

Treatment and control stores pairs:

Treatment Store	Control Store 1	Control Store 2
1664	1857	7162
1675	2114	1508
1696	1863	7284
1700	1662	7037
1712	7434	8162
2288	9188	2752
2293	11468	9918
2301	9238	12019
2322	10468	9388
2341	11368	2572

Recommendation

I would recommend that the company will roll out the updated menu to all its stores. As indicated by a comparison of the treatment-control pairs, that %100 of the treatment units revealing a positive lift in the sum of gross margin.



The Lift

For the Stores in the west Region:
A comparison of the treatment-control pairs shows a lift of 35.4% in sum of gross margin for the treatment units over the control units.
While the average percentage change in Sum_Gross Margin was 39.2% for the treatment units in the test period relative to the comparison period compared to 2.9% for control unit with the same measures.

Lift Analysis for Sum_Gross Margin

Lift	Expected Impact	Significance Level
35.4%	490	99.4%

Summary Statistics for Sum_Gross Margin by Test Group

Statistic	Treatment	Control
Average	39.17	2.89
Minimum	12.34	-9.47
Maximum	55.30	16.35
Standard Deviation	16.34	9.87

[Ghadeer Alodaib | https://github.com/Gdtheodd/My-Projects-Gallery]

For the Stores in the Central Region:

A comparison of the treatment-control pairs shows a lift of 44.7% in sum of gross margin for the treatment units over the control units.

While the average percentage change in Sum_Gross Margin was 39.7% for the treatment units in the test period relative to the comparison period compared to -2.37% for control unit with the same measures.

Lift Analysis for Sum_Gross Margin

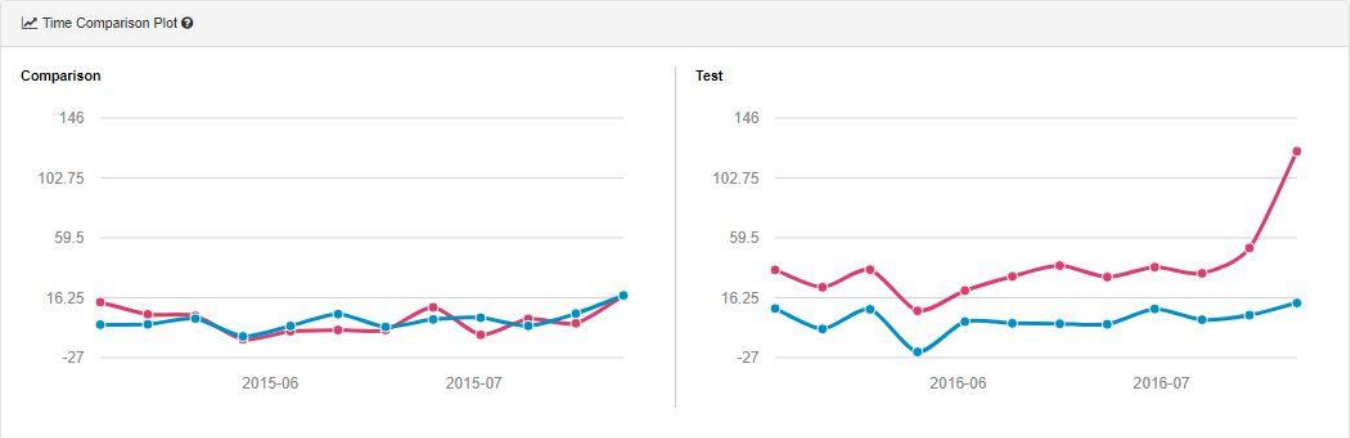
Lift	Expected Impact	Significance Level
44.7%	862	99.6%

Summary Statistics for Sum_Gross Margin by Test Group

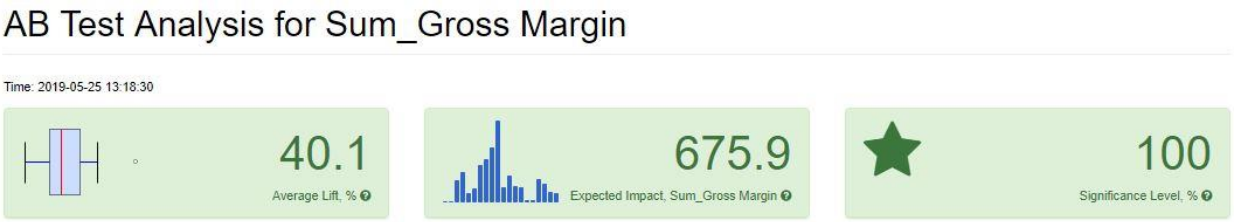
Statistic	Treatment	Control
Average	39.74	-2.37
Minimum	20.09	-17.68
Maximum	67.52	7.93
Standard Deviation	17.15	9.37

The lift from the new menu overall

Time comparison significantly showing that the treatment units (in red) has outperformed the control units (in blue) with respect to the gross margin during the test period compared to the same period in the previous year.



Additionally, The AB test Analysis shows a lift of 40.1% in Sum_ Gross margin for the treatment units over the control units which resulted in an expected impact of 676 on Sum_Gross Margin. Also, it indicates that the average percentage change in Sum_Gross Margin was 39.5% for the treatment units in the test period relative to the comparison period compared to 0.26% for control unit with the same measures.



Lift Analysis for Sum_Gross Margin

Lift	Expected Impact	Significance Level
40.1%	676	100.0%

Summary Statistics for Sum_Gross Margin by Test Group

Statistic	Treatment	Control
Average	39.45	0.26
Minimum	12.34	-17.68
Maximum	67.52	16.35
Standard Deviation	16.30	9.75