

Analysis of the Test on the Measure Sum_Gross Margin

Test Start Date: 2016-04-29

Test End Date: 2016-07-21

Additional Information:

Test Summary

The average percentage change in Sum_Gross Margin was 39.7% for the treatment units in the test period relative to the comparison period. This same measure was -4.8% for the control units, with the difference between the treatment and control units being 44.6%, which is highly statistically significant. More detailed summary statistics for the treatment and control groups are contained in the first table (which immediately follows), while the details of the hypothesis test of a significant difference in the mean average percentage change in Sum_Gross Margin is contained in a table at the end of this report.

A comparison of the treatment-control pairs indicates an average lift in Sum_Gross Margin for the treatment units over the control units of 47.1%, which results in an expected impact of 855 on Sum_Gross Margin, with 100.0% of the treatment-control pairs exhibiting a positive lift for the treatment units.

Lift Analysis for Sum_Gross Margin

Significance Level	Lift	Expected Impact
99.6%	47.1%	855

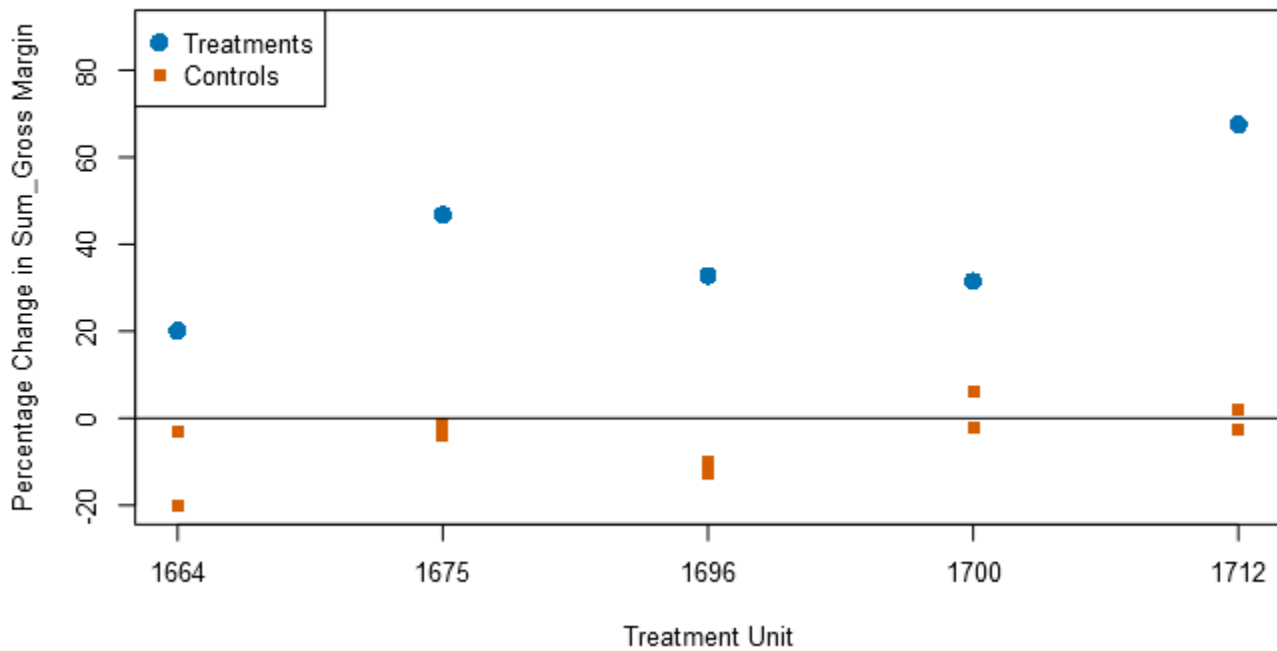
Summary Statistics for Sum_Gross Margin by Test Group

Statistic	Treatment	Control
Average	39.74	-4.82
Minimum	20.09	-20.05
Maximum	67.52	6.37
Standard Deviation	17.15	7.63

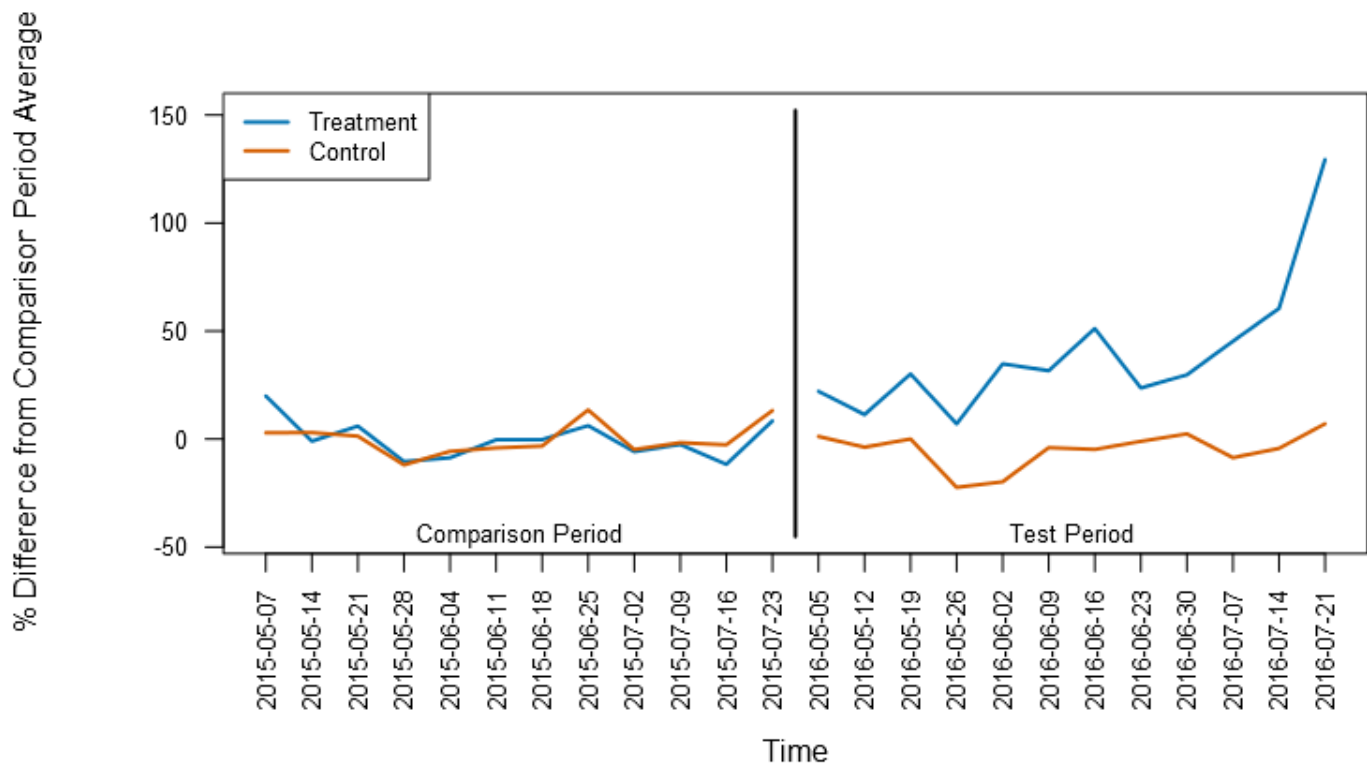
Plots of the Test Results

In the dot plot(s) below, each column of dots gives the percentage change in Sum_Gross Margin from the same period as the test period, but one year earlier, and the test period for a treatment unit and the control units assigned to that treatment unit. An examination of a dot plot chart allows for a rapid determination of whether (and which of) the treatment units outperformed the control units with respect to Sum_Gross Margin.

Dot Plot of the Percentage Change in Sum_Gross Margin Between the Test Period and the Same Period Last Year

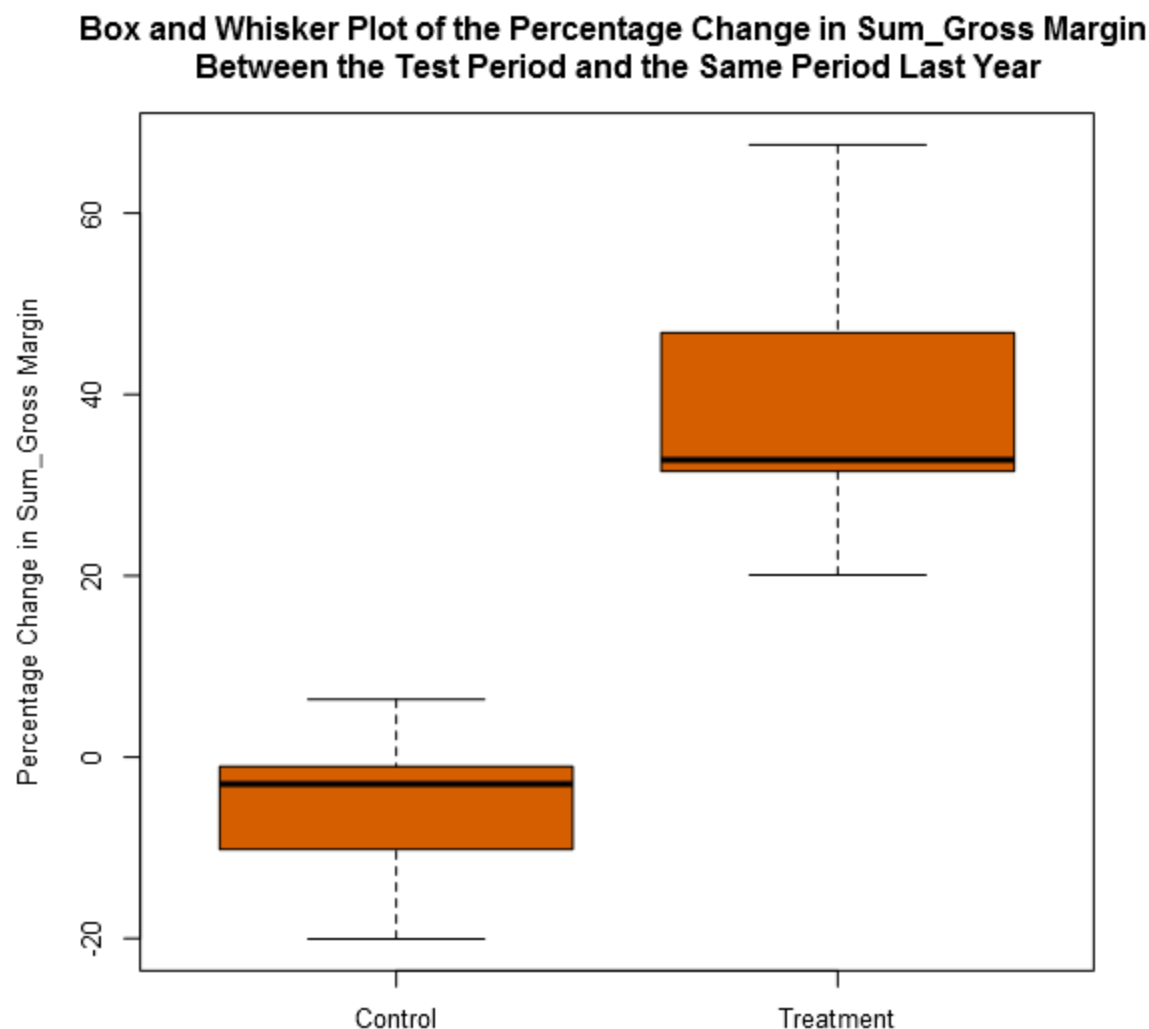


Time Comparison Plot of Sum_Gross Margin



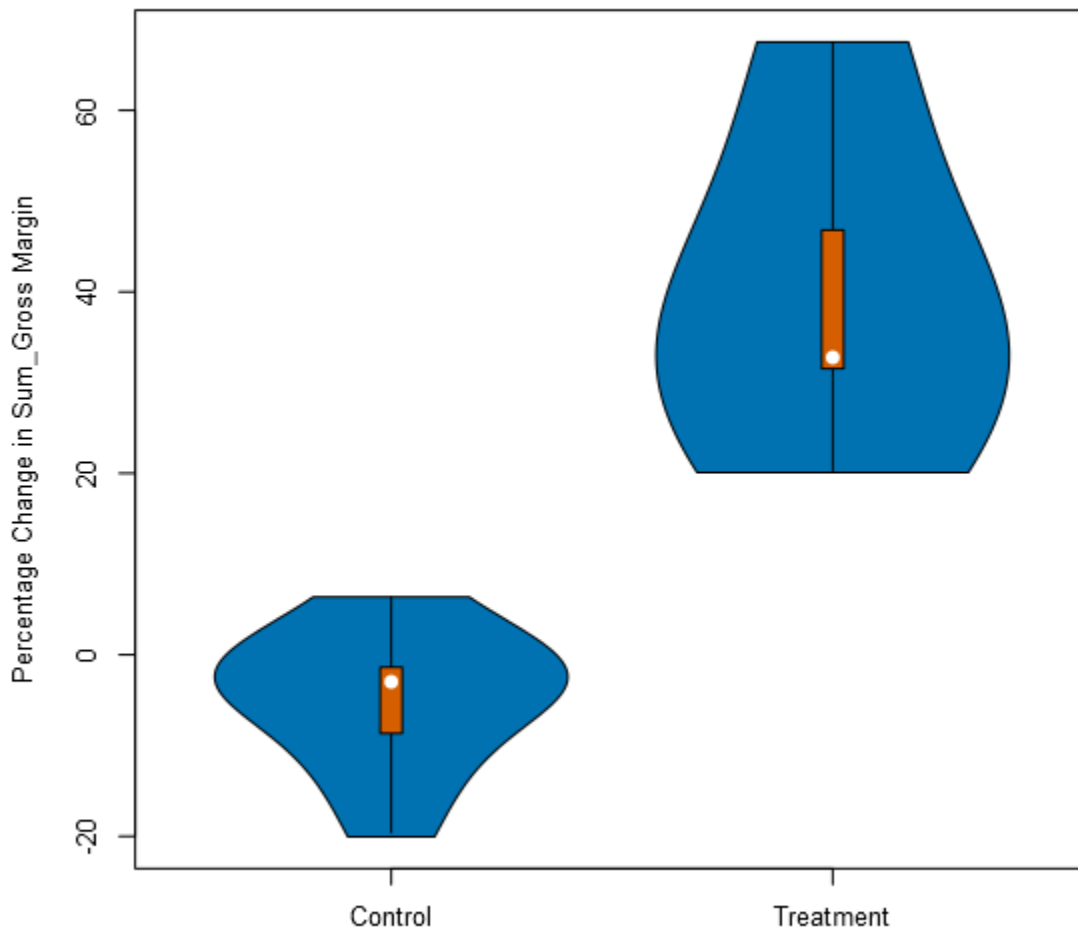
The time comparison plot provides a visualization of the average effect of the test treatment across the test units for the performance measure of interest. The performance measure is normalized to be the percentage difference between the value of that measure in each reported time unit and the average of that measure for the entire comparison period, and

then averaged across stores of each unit type (treatment or control) in each reported time unit.



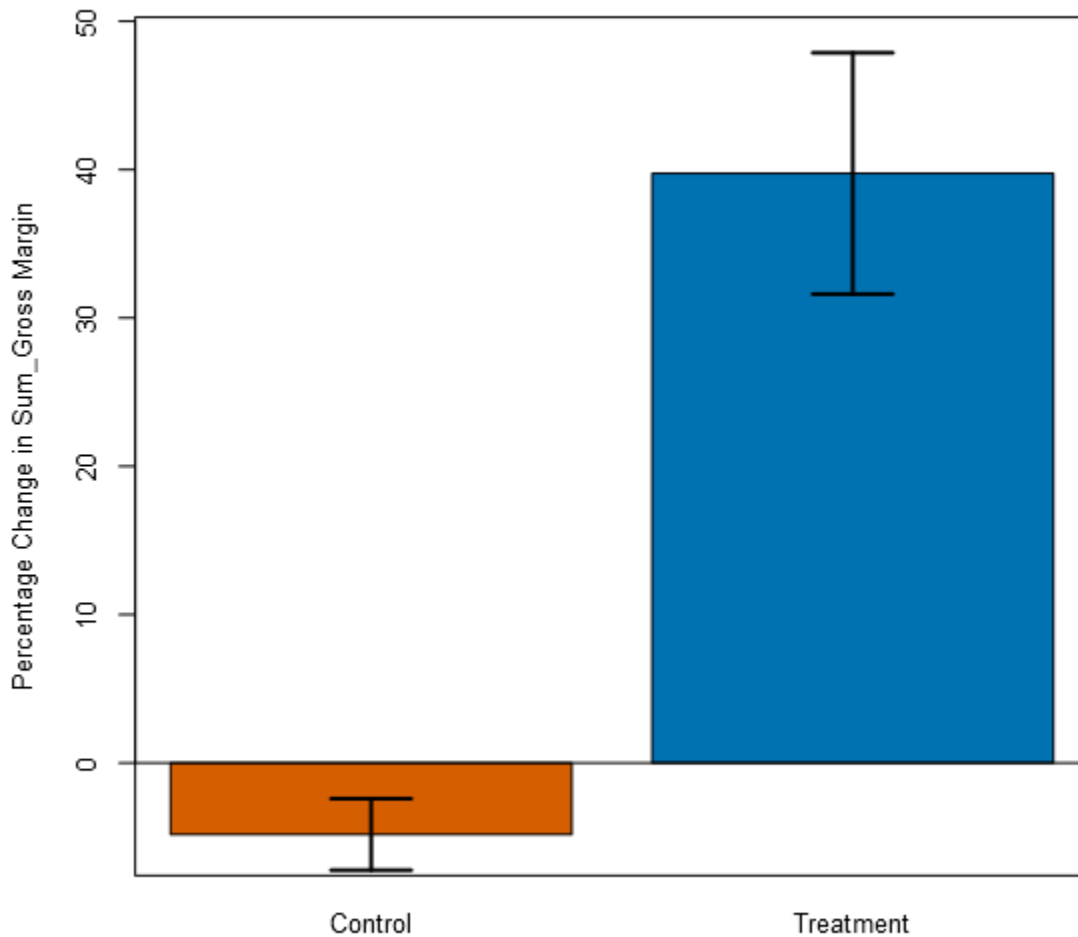
The box and whisker plot provides information about the distribution of the percentage change in Sum_Gross Margin between the test period and the same time period one year earlier for both the treatment and control units. In the plots, the bottom and top of the orange box are at the first and third quartiles, and the line inside the box is at the median for each test group. The vertical bars that extend above and below the box indicate the range of the data that is within 1.5 times the interquartile range (where the interquartile range is the difference between the values of the third and first quartiles).

**Violin Plot of the Percentage Change in Sum_Gross Margin
Between the Test Period and the Same Period Last Year**



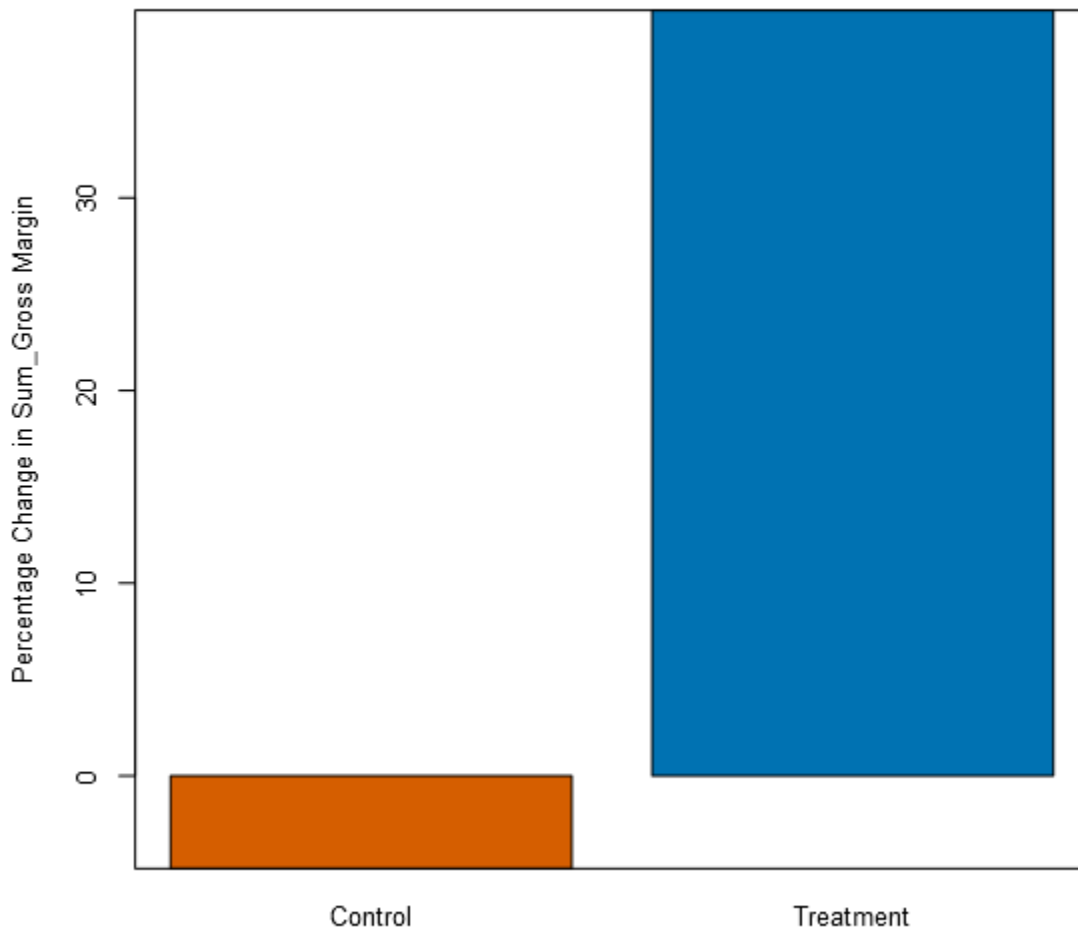
The violin plot provides information about the distribution of the percentage change in Sum_Gross Margin between the test period and the same time period one year earlier for both the treatment and control units. The width of each "violin" for a given value of the Percentage Change in Sum_Gross Margin is based on the local density of values near that point. Where the violin is thick there are a number of test units with similar values for the measure, while there are few values for the Percentage Change in Sum_Gross Margin where the violin is comparatively thin. The inner (orange) portion of each violin is a box and whisker plot of the data, where the bottom and top of the orange box are at the first and third quartiles, and the white circle inside the box is at the median for each test group. The vertical bars that extend above and below the box indicate the range of the data that is within 1.5 times the interquartile range (where the interquartile range is the difference between the values of the third and first quartiles).

**Dynamite Plot of the Percentage Change in Sum_Gross Margin
Between the Test Period and the Same Period Last Year**



In the dynamite chart the blue bar gives the mean value of the percentage change in Sum_Gross Margin between the test period and the same time period one year earlier for both the treatment and control groups, while the black error bars provide a one standard error range around the mean values. If there is a statistically significant effect associated with the treatment, then the error bars for the treatment and control groups should not overlap.

**Bar Plot of the Percentage Change in Sum_Gross Margin
Between the Test Period and the Same Period Last Year**



In the bar chart the orange bar gives the mean value of the percentage change in Sum_Gross Margin between the test period and the same time period one year earlier for both the control group, while the blue bar gives the same information for the treatment group.

Welch's Two Sample t-test(s) of Sum_Gross Margin by Test Group

Test	t-Statistic	Degrees of Freedom	p-Value
Control vs Treatment	-5.25105	4.71830	0.003938