HALO AND CANNIBALISATION: ANALYZING THE OVERALL LIFT DUE TO PROMOTION

Cannibalisation: Loss in sales of competing/substitute items due to anchor item's promotion.

Halo: Lift in sales of items that go well with the anchor item (complementary items).

While normal promotional activities tend to increase the sales of the promoted product, the halo effect increases the sales of all its complementary items during the same promotion period. Thus, the halo effect can simply be considered as a special kind of promotion, which is active when a product's halo relatives are having sales promotions. However, it should be kept in mind that the halo effect is weaker than the effect of the original campaign unless the products are always bought together.

Objective: Calculate "true uplift" due to promotion on a given item considering Halo/Cannibalization impact

$$\textbf{True uplift= q} - \textbf{b} + \sum_{i=1}^{m}(q_i - b_i) * p_i + \sum_{j=1}^{r}(q_j - b_j) * p_j$$

Where:

m: number of complementary items of the base item
r: number of substitute items of the base item
q: quantity sold during promo-week
b: predicted baseline sale of the product during promo-week
p: normalized price ratio of complementary/substitute item to the base item

$(q - b)$ = uplift

Algorithm:

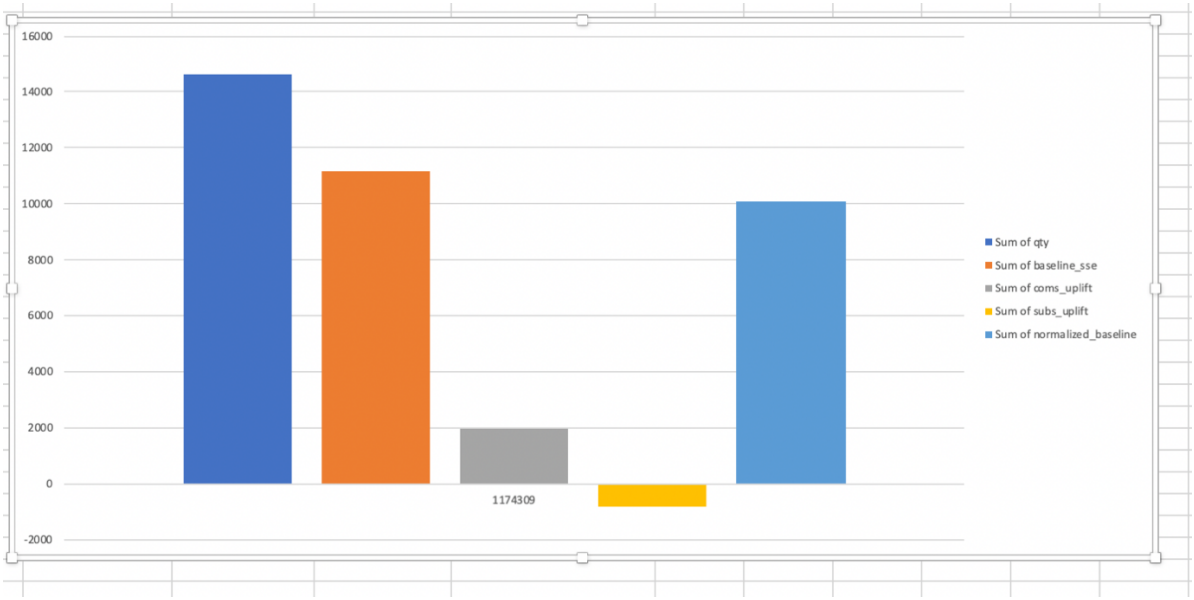
-Select a promo-week
-Take the list all of promoted items in the given promo-week
-Using the baseline estimation of promoted item and quantity of items sold during promo-week (**qty**), calculate the uplift in sales due to promotion (**uplift)**
-Collect list of complementary and substitute items of each promoted item in the given week
-Calculate the baseline estimation of each complementary/substitute item (3 weeks average)
-Calculate change in sales of each item (in case of complementary items change in sales will be positive while for substitute items it will be negative)
-Calculate normalized price ratio of each complementary/substitute item to its base item
-Multiply change in sales of each product with its price ratio
-Sum up all calculated change of sales of complementary items of a given base item (**coms_uplift**)
-Similarly sum up all calculated change of sales of substitute items of a given base item (**subs_uplift**)

adjusted_uplift=uplift + coms_uplift + subs_uplift

Thus,
new_baseline = qty – adjusted_uplift

Thresholding:
Check the percentage change in new_baseline from calculated baseline
If percentage change >10, keep the calculated baseline as new_baseline.

Histogram for item: **1174309**



Assumptions:

1) Complementary/substitute items are not in promotion during current promo weeek (Ignoring complementary/substitute items uplift that are also in promotion)
2) Nullifying impact of complementary items those showing negative uplift and substitute items those showing positive uplift (by making their uplift =0)
3) Not considering if the given anchor item is also a complement or substitute of any other item that is also in promotion