Determining cannibalization rates from sales data (topic presentation)

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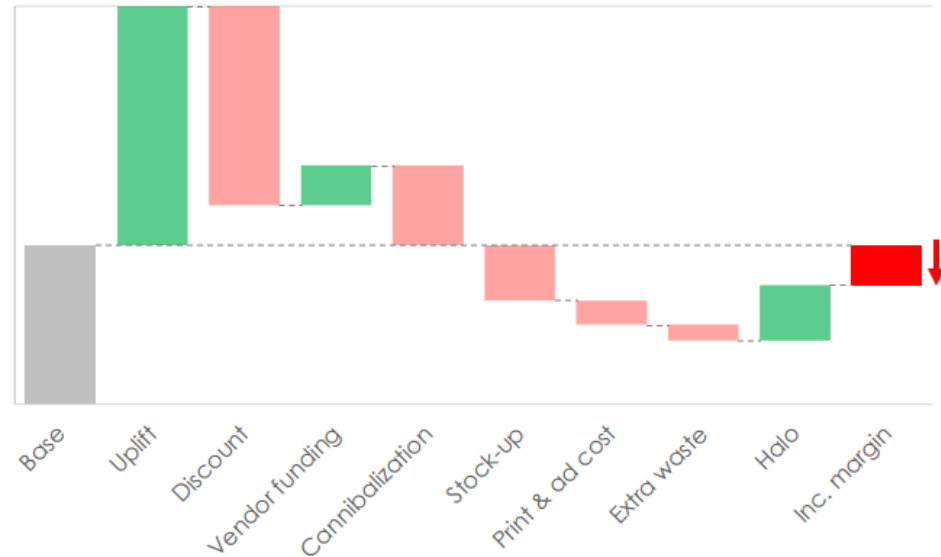
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Background

- Extremely price driven retail landscape in Finland

- Promotion efficiency
  - Looking at uplift and discount is not enough

Incremental margin (€M)

Base | Uplift | Discount | Vendor funding | Cannibalization | Stock-up | Print & ad cost | Extra waste | Halo | Inc. margin

https://www.sellforte.com/pdf/Sellforte_Stockmann_Delicatessen_Promotion_Effectiveness_Case_Study_2017.pdf

- Some of the promotion uplift comes from decreased sales in other similar products. This is known as cannibalization

Goals

- An overview of previous methods

- An insight on how strongly different products cannibalize each other on item level (as opposed to e.g. category level)

- A robust method that can handle simulated data with added noise

Definitions

- Only cannibalization and complementarity ("negative cannibalization") considered, stock-up and seasonality not considered

- The method is not intended to work on data with multiple consecutive and simultaneous promotions, as such method would be significantly more difficult to implement

Sources

- An Implemented System for Improving Promotion Productivity Using Store Scanner Data (Abraham & Lodish, 1993)

- Actual customer data for developing the methods

- Simulated data replicating the customer data for the thesis results

- Coworkers at Sellforte

Methods and tools

- Pandas library in Python is used to process the data
- Form a matrix C, where elements C_{ij} specify cannibalization rates for product j cannibalizing product i
  - Determine weekly promotion uplift U and cannibalization D from data by comparing to last week
  - Assume form UC = D
  - Least squares approximation for C

Schedule

- 2-3/2018: familiarization with tools and data
- 11.4.2018: topic presentation
- 4-5/2018: building and validating the model
- 11.6.2018: final presentation
- 6-7/2018: writing the thesis