Analytical Decision Making

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Homework Part B

Instructions:

1. The homework is a graded assignment. You can decide to do this assignment in groups of 5 students max. However, each student can submit a report (reports could be the same)

2. Due date: **June 2, 2021 at 1pm.**
    a. Late assignments won't be graded.
    b. No extension.

3. Please submit a Jupyter notebook with your answers and codes. I will use https://colab.research.google.com/ to check the notebooks, so make sure they work on this platform. You can also submit a word document saved in PDF and the codes independently.

4. In your Jupyter notebooks, feel free to add comments throughout the code (e.g., "#This kind of comment") to help me follow what you are doing. No need to comment every line.

5. Please submit a copy of your assignment on Canvas.

6. Make sure to include the names of all group members in the report and Jupyter notebook.

You will be evaluated on:

- Rigor of the analyses
- The performance metrics (See points 2a and 2b below)
- **Quality of exposition and writing**

Questions

The goal of the assignment is to refine what we have done in class optimizing discount given to prospects.

Using the data used in class on B2B pricing (https://raw.githubusercontent.com/ormarketing/b2b/master/data.csv),

1. Split the data in two samples, a training sample and a hold-out sample (make sure to be clear about how you split the data set).
2. Using the estimation sample, estimate one or several logit models (or something else). Your performance metrics are (I'll use these two metrics to compare groups, see p. 194 in the reading on B2B pricing):
    a. Expected revenue improvement over un-optimized discounts (take the actual discounts in the data-set) for leads in the hold-out sample
    b. Expected revenue improvement over optimized discounts (based on your estimation results, optimize discounts offered to leads in the hold-out sample).

Assume that the variable "amount" is not optimized on.

Things to considered:

- There is probably an "end-of-the-quarter" effect, i.e., as the end of the quarter approaches, salespeople might give deeper discount.
    - You might want to test this hypothesis
    - Consider calendar quarter, e.g., Q1: Jan-March.
- Billing-plan is a variable we didn't use.
- You might want to try different logit models for the four possible product/channel consideration
- You can follow what we have done in class (i.e., estimating logit models and then optimizing discounts), or you can use any other technique you think would be better. The only requirement is that your "calibration" is done on the estimation sample.

Please submit:

- The Jupyter notebook where you do your calculations (be as clear as possible).
    - I'll run the codes on Colab, so make sure that they run.
- A three-page memo explaining what should be the new discounts strategy (and why) and how it compares to the old approach.
    - You can add appendices if necessary.

You will be evaluated on:

- Rigor of the analyses
- The performance metrics
- Quality of exposition and writing