Rotman

RSM-8423 – Optimizing Supply Chain Management and Logistics, Winter 2023

Case Study 1 (ComfortHealth) – Guide

1. Start by thinking about how you will calculate and represent the future demand at each region.
    a. Create the plots *year vs. demand* per region. How would you forecast demand?
    b. Use a **deterministic** demand for your models based on that forecast. Do not worry about uncertainty at this point.

2. Next, create a first (simple) model based on the information that you have.
    a. This is a location problem, just as we saw in Class 4.
    b. Consider only one year at this point; e.g., only 2023 and its associated forecasted demand.
    c. Map the ComfortHealth costs and revenues into the parameters $\boldsymbol{c_{ij}}$ and $\boldsymbol{f_i}$ that you have in Class 4. Do not worry about additional decisions (such as the number of workers to hire) at this point or the fact that you have multiple years.
    d. Copy and paste the code from Class 4, and run your model with the parameters you defined after making all appropriate adjustments. Think carefully about whether you need to satisfy all the demands exactly.
    e. Observe the solution and fix any potential bugs that you may find.

3. Next, extend your model from item (2) to also account for the next 3 years.
    a. This amounts to changing variables $\boldsymbol{x}$ in a way to incorporate the flow **per period**. How would you do that? (Hint: class 3).
    b. Re-run the model, always checking the solution to see if it is running without errors.

4. Now, incorporate the other decisions into your model.
    a. To incorporate the hiring of workers, you will do similar to what we did in Class 3. That is, add variables and constraints to represent the **flow** of workers per period. These variables will limit the number of hours that each center can provide (i.e., the sum of **x** per period).

5. **Very important**: Analyze the solutions you found during the process.
    a. Which centers were opened? What are the center-region allocations? How many people were hired? What happens when all patients are accepted?
    b. Is there any intuition on why the model made those decisions? How would you justify them? Use plots if needed (they are great!) and write those insights into your report.
    c. Focus on being succinct and accurate in your write-up.

6. Challenge: If you have the time (only if!), incorporate uncertainty in your model
    a. Try two or three different demand scenarios. Do your solutions change a lot?