STAT 165/265 HW 7

March 14, 2025

Due Friday, March 14, 2025 at 11:59pm

Deliberate Practice: Prioritizing Information

Expected completion time: 90 minutes
Graded on completion

In this deliberate practice, produce a forecast for the following question:

> What will the price of crude oil be on March 17, 11:59 pm PT? (Specifically WTI Crude Futures)

using techniques from lecture, by going through the following steps: (note that for this exercise, we intentionally want you to limit the time you spend on each step, since we are practicing prioritizing the most important considerations given time constraints – set a timer if it would help!)

1. Spend **10 minutes** brainstorming key considerations that would affect your forecast.
2. Spend **5 minutes** assigning ratings to each of the considerations for importance, uncertainty, and how quickly you can resolve the uncertainty (as in Lecture 11).
3. Using those ratings, rank the considerations in order of priority to reduce uncertainty. Spend **30 minutes** using Google/other resources to reduce uncertainty on those top ranked considerations.
4. Spend **10 minutes** to re-evaluate the uncertainty on your considerations.
5. Spend **30 minutes** writing up this exercise. Please include:
    - Your considerations, ratings, which considerations you chose to research, and how much uncertainty you reduced using external sources.
    - Your final point estimate (mean estimate) for the forecast.

- Reflections on the exercise – were some considerations harder than expected to research? If you were to do this again, would you have chosen different considerations to research with your 30 minutes?

Submit this writeup to Gradescope.

Deliberate Practice: Structural vs. Numerical Uncertainty

Expected completion time: 110 minutes
Graded on completion

Using the forecast you created for the above question, assess the uncertainty of your point estimate with the following steps:

1. Assess structural uncertainty:
    - Brainstorm 2 considerations relevant for structural uncertainty, i.e. considerations that could cause your previous estimate to be totally off (see Lecture 12 for examples).
    - For each of these considerations, quantify how much they would change your estimate, and quantify the probability that these considerations turn out to be true and relevant.
    - Based on this, create an 80% confidence interval around your original point estimate based on structural uncertainty.
2. Assess numerical uncertainty:
    - For 2-4 of the considerations you generated above in Deliberate Practice: Prioritizing Information, assess the sensitivity of your forecast to numerical uncertainty in these considerations.
    - Based on this, create an 80% confidence interval around your original point estimate based on numerical uncertainty (if you had additional considerations beyond these 2-4, there's no need to do extra work to explicitly assess their sensitivity, but try to subjectively include their uncertainty in this 80% interval).
3. Combine the structural uncertainty confidence interval and the numerical uncertainty interval into a final 80% confidence interval for the forecast question.
4. Write up your considerations, quantifications, and reflections on the final confidence intervals you produced.

Predictions

Expected completion time: 90 minutes
Graded on accuracy as part of the class forecasting competition

Make and submit predictions to the questions on this Google Form:
https://forms.gle/j9xaKqpwA2ibuiTU7.

Be sure to follow the format described at the top of the form. For each question, you will submit a mean and inclusive 80% confidence interval or a probability (whichever the question asks for). We provide cells on the Google form for you to type out your reasoning (1-2 paragraphs), which you should submit to Gradescope with the rest of this assignment. For questions 1-3, your prediction (but not the explanation) will appear on the public leaderboard.

Final Project: Initial Steps

Familiarize yourself with the final project description To get credit in this section state the following,

"I have read and understood the final project description, including its objectives, requirements, and deadlines. I acknowledge that I am responsible for meeting all stated expectations and will seek clarification if needed."

[STAT 265 only] None this week!