AGEC622 - Agribusiness Analysis and Forecasting
08_Exercises

- Complete the exercises in the provided notebook "08_exercises.xlsx". a
- If there is more than one question, note that each will have its own tab in the workbook.
- Work vertically down the sheet within your notebook. Separate the individual parts of the question(s) (a, b, c, ...) using dividing rows like the blue example dividers in the file.
- Submit your completed .xlsx file via Canvas.

Question 1. The overall objective of this question is to repeat the analysis from the 07_exercises, but with careful specification of the probability distributions that will be used for stochastic draws. You will use the CDFDEV function in Simetar to determine the best parametric (or nonparametric) distribution for each stochastic variable, and use hypothesis tests for the means and variances of the simulated values to determine if that best parametric distribution adequately represents the variable. If you do not use the parametric distribution with the lowest CDFDEV value, describe you reasoning for doing so. For parametric distributions, we will test only $Beta$, $Uniform$ and $Normal$ distributions, along with an $Empirical$ distribution, which is non-parametric.

Parameters for the 4 distributions:

- $Beta_x\ (\alpha, \beta, Min, Max)$
- $Normal_x\ (\mu, \sigma)$
- $Uniform_x\ (Min, Max)$
- $Empirical_x\ (x_1, x_2, ..., x_n)$

a) **Build a model for the crop price.** Repeat step a) from the 07_exercises, but use the most appropriate probability distribution for drawing random residuals/errors/innovations. In the process of doing this, you will generate a "SimData" sheet in your workbook. Rename this to "SimData-a" so that it is not corrupted by the steps below.

b) **Build a model for the crop yield.** Repeat step b) from the 07_exercises, but use the most appropriate probability distribution for drawing random residuals/errors/innovations. Rename the resulting "SimData" sheet to "SimData-b".

c) **Set up stochastic simulation for the gasoline price.** Repeat step c) from the 07_exercises, but use the most appropriate probability distribution for drawing random residuals/errors/innovations. Rename the resulting "SimData" sheet to "SimData-c".

d) **Build a model for variable cost (VC).** Repeat step d) from the 07_exercises, but use the most appropriate probability distribution for drawing random residuals/errors/innovations. Rename the resulting "SimData" sheet to "SimData-d".

e) **Calculate financial variables for the enterprise.** Calculate NR and ending cash (beginning cash + NR) for each year for 2022 through 2026, following the approach and parameters for this purpose from the 07_exercises.

f) **Simulate 2026 ending cash.** Determine the following values:

- Expected ending (2026) cash
- The probability ending (2026) cash is less than \$0
- The probability ending (2026) cash is less than \$100,000

g) **Interpret.**

- What differences in the results do you find?
- Do you have more confidence in these results or those from the 07_exercises?
- What problems, if any, do see with the revised model/analysis?
- Did *Empirical* distribution produce the lowest CDFDEV value when compard to other distributions in parts a-d? Why do you think it happened?