AGEC622 - Agribusiness Analysis and Forecasting
01_Assignment

- Complete the exercises in the provided notebook "01_assignment.xlsx".
- 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.

a) **Estimate a regression model for wheat planted acres (PA).**

$$PA_t = \beta_0 + \beta_1 PA_{t-1} + \beta_2 PRICE_{wheat,t-1} + \beta_3 PRICE_{soybeans,t-1} + \beta_4 PRICE_{corn,t-1}$$

When setting up your data, be very careful to correctly align contemporaneous and lagged values. Do the signs of the coefficients make sense? Explain.

b) **Estimate a regression model for wheat yield**. Generate the variable *yield* per *harvested* acre and run the regression.

$$YIELD_t = \beta_0 + \beta_1 T_t + \beta_2 T^2$$

In the regression, are there any variables that you might leave out? Justify your answer.

c) **Estimate a regression model for wheat harvested acres (HA) as a function of planted acres (PA)**.

$$HA_t = \beta_0 + \beta_1 PA_t$$

d) **Estimate a regression model for wheat imports**.

$$IMPORTS_t = \beta_0 + \beta_1 YEAR_t + \beta_2 PRICE_{wheat,t-1}$$

e) **Produce stochastic forecasts**. Set up stochastic draws for the variables below for year 2025. For each variable that was a dependent variable in the regression above, specify an appropriate normally distributed stochastic deviation. For some other variables, you will need to specify an appropriate identity.

- Wheat planted acres
- Wheat yield
- Wheat harvested acres (a function of your year 2025 stochastic draws for PA)
- Wheat imports
- Wheat production (product of your stochastic draws for yield and harvested acres)
- Wheat total supply (sum of your stochastic imports, stochastic production and beginning stocks). Assume the 2025 beginning stocks = 826.

f) **Create PDFs for year 2025 wheat yield, production and total supply**. After simulating the total year 2025 wheat yields, produciton and supply, use the simulated values to create the PDFs for them.

g) **Create a CDF for year 2025 wheat, yields, production and total supply**. Use the simulated values to create a CDF for the variables.

- What is the probability that wheat yield in 2025 will be greater than 50 bushels per acre?
- What is the probability that wheat production in 2025 will be between 2000 and 2500 million bushels?
- What is the probability that total wheat supply in 2025 will be less than 2800 million bushels?