

AGEC622 - Agribusiness Analysis and Forecasting

02_Exercises

- Complete the exercises in the provided notebook “02_exercises.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).**

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

When setting up your data, be very careful to correctly align contemporaneous and lagged values.

- b) **Estimate a regression model for wheat yield.** Note that the data here are yield per *harvested* acre.

$$YIELD_t = \beta_0 + \beta_1 YEAR$$

- 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 2022. 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 2022 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 draws for imports and production)
- f) **Create a PDF for year 2022 wheat total supply.** After simulating the total year 2022 wheat supply, use the simulated values to create a PDF for it.
- g) **Create a CDF for year 2022 wheat total supply.** Use the simulated values to create a CDF for it. What is the probability that total wheat supply in 2022 will be less than 2000 million bushels? **Hint: use function = edf().**
- h) **Interpret.** In the regression in step a), are there any variables that you might leave out? Justify your answer. Consider both statistical significance and economic theory motivations.