

AGEC622 - Agribusiness Analysis and Forecasting

03_Exercises

- Complete the exercises in the provided notebook “03_exercises.xlsx”.
- If there is more than one question, note that each will have its own tab in the workbook.
- 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.

For this question, you will fit a model for monthly chicken slaughter data potentially using any or all of a trend, an annual/seasonal cycle, and a longer cycle.

- Set up the data.** Set up an area where you will put a new copy of the data. At the top of this area, put a single cell where you will put a cycle length for a longer cycle. Create variables for T , T^2 , $ANNUAL_SIN$, $ANNUAL_COS$, $CYCLE_SIN$, and $CYCLE_COS$. The last two variables should reference the cycle length at the top of the sheet so that you can create data for a different cycle length by changing that one cell, without needing to create whole new versions of $CYCLE_SIN$ and $CYCLE_COS$. **Should T^2 be included in the model?**
- Estimate a regression model.** Estimate a regression model for the chicken slaughter, including T , T^2 (if applicable) and all four of the variables you created above as independent variables.
- Determine the optimal cycle length.** Create tables of the *MAPE* and *Schwarz Information Criterion* values for cycle lengths of 36, 48, 60, . . . ,168 months (i.e. 1 year increment). Highlight the optimal cycle length in your table. You can complete this part by simply changing the cycle length in your data in part a). That is, you do not need to present a new data set and a new regression output for each cycle length in the answer for this section. **Did MAPE and Schwarz values produce the same optimal cycle length?**
- Stochastically simulate the chicken slaughter for March, April and May in year 2022.** Using the optimal cycle length. . .

- Determine the values for months March, April and May for the independent variables in the model. Use these to create a conditional mean forecast.
- Specify a normally distributed stochastic error terms, using appropriate values based on the regression results.
- Specify formulae for the final stochastic chicken slaughter numbers. Simulate these numbers.
- Use the simulated values to create a PDF plot for the March chicken slaughter.
- What is the probability that chicken slaughter in March will be less than 700,000?
- What is the probability that chicken slaughter in April will be more than 750,000?