

Download the Excel dataset “HW3 Data.xlsx” from the class website. Use the data on the “Part_1” tab for Part 1 below. Use the “Part_2” tab for Part 2.

Part 1

1. The “Y” variable is observed quarterly in this series from 4th quarter of 1999 (1999Q4) through the 3rd quarter of 2021 (88 total observations).
2. Fit quadratic and log-linear trend models with quarterly seasonal effects to these data and provide copies of the residual plots.
3. Based on the residual plots, which model do you feel is more appropriate? Why?
4. Based on the regression output, in which quarter is the seasonal peak and in which quarter is the seasonal trough? What is the basis for your answer?
5. Based on your preferred model, write out the forecasting equation for a T+3 forecast (that is, a forecast for the 2nd quarter of 2022).

Part 2

1. The “LFP_16_19” is the Labor Force Participation Rate (seasonally adjusted) for ages 16–19 observed monthly from January 2000 through December 2019 (240 total observations).
2. Provide a time series plot of these data. Based on the plot, it appears that there is a trend break in the series that occurs in about January 2011.
3. Estimate a piece-wise linear trend model that allows both the trend slope and intercept to shift beginning in January 2011. Provide a ‘fitted-actual’ plot for this model.
4. Now impose a Spline restriction and provide a ‘fitted-actual’ plot for the Spline model.