

Download the Excel dataset “HW6 Data.xlsx” from the class website. The “Texas” tab has quarterly data series over the period 2005 Q1 – 2022 Q4, for the portion of Texas GDP attributable to Retail Trade (Retail_GDP) and per capita personal income (P_Inc).

1. Provide time-series plots of the two series and the log of the two series. Does a log transformation appear to be appropriate to stabilize the variance?
2. Based on your answer to part 1, use the `ndiffs()` function on either the level or the log of the two series and report the order of differencing necessary to get a stationary series.
3. Create a “training” data series ending 2021 Q4 of the log or level differenced series based on your answer to part 2.
4. Use `VARselect()` to allow R to choose the best VAR model lag order for the two series, *assuming the series is non-seasonal* (use `season=NULL` in `VARselect`).
5. Based on the `VARselect` results, use `VAR()` to estimate a VAR model with appropriate lag lengths (use `season=NULL`).
 - a. Report the summary of the fitted model.
 - b. Use `causality()` with the retail variable as the cause for the fitted model. Report and interpret the results.
 - c. Repeat 5.b with the personal income variable as the cause.
6. Use the `predict()` function to generate forecasts for 2022 Q1 – 2022 Q4.
 - a. Based on the forecasts and original data, “undo” and differencing or log transforms to create plots of the actual and forecasted values (this may be easiest in Excel).

Organize your results in a PDF document to upload to Canvas along with your code.