A Forecasting Project

Your task is to analyze time series data and present your forecasts to a group of business professionals. Your audience is familiar with basic concepts of econometrics and forecasting. Your presentation will consist of three videos. The first two videos are draft videos, while the third video is the final presentation. Your objective is to make optimal forecasts on the time series of your choice and assess your forecasts using in-sample and out-of-sample evaluations.

Format: Make video presentations of your project. Each group member should take part in the video creation and present part of the presentation. Overall You will make three videos. The first two should take about 5 minutes each. The content of these two videos are not graded. Instead, you make them to share your work and get feedback from your classmates and me. The final video should take about 10 - 15 minutes.

Step 1. Explore the data and perform in-sample evaluations

In the first video, you need to find a time series data that interests you, is approximately stationary or can be made stationary, and has at least 100 observations. You will perform in-sample evaluations by loading the data into RStudio, plotting the time series, and removing trend and seasonality when needed. You will also stationarize the time series using first differencing when necessary. Based on the ACF and PACF, you will choose three linear models (MA, AR, or ARMA) and estimate them. You will present the estimation results, show the ACF and PACF correlograms of residuals from each specification, and verify they are white noise using Q-Test. You will summarize all the model estimation and evaluation in a table (refere to table 8.2 on page 214 in your textbook) and make a six-month ahead forecast. You will plot the multistep of forecasts and their correspondence bands for each specification and comment on your preferred model and why. Please name your video , Group <#> Final Project - Step1.

Step 2. Perform out-of-sample evaluations

In the second video, you will perform out-of-sample evaluations. You will describe your forecasting environment and make the following options: one-step ahead forecast (h=1), split your into two parts. Using the first 90% sample as estimation sample and the rest as prediction sample. use the fixed sampling scheme, consider at least three models (at least one of them is ARMA models, which

could be AR,MA, or ARMA). You will use quadratic loss function and Mean Squared Error (MSE) to choose the optimal forecast. You will implement the forecast optimality tests (MPE and informational efficiency tests) for each model, discard any model if necessary, and add a simpler forecast that is calculated by averaging the last four observations, $f_{t,1} = (y_t + y_{t-1} + y_{t-2} + y_{t-3})/4$. You will implement the test of unconditional predictability and explain which forecast is preferred. You will make a combined forecast from the ARMA models and the simpler moving average forecast using the OLS weighted combination scheme. You will show the MSE of three forecasts and comment on which one you prefer.Please name your video , Group <#> Final Project - Step2.

Step 3. Create the final video of your project

In the final video, you will put the first two videos together and create a complete video. You will provide a one-sentence summary of each group member's contributions to the project. Your submission should include

1. A video presentation in .mp4 format
2. presentation slides
3. R code and a separate data file

Please name your video , Group <#> Final Project - Step3.