SUMMARY In this installment 3 you will do some edits that you missed in the previous installment 1 and 2. Then you will start section V on your vector autoregressive model (VAR) and impulse response analysis to simulate the effects of shocks on the system that you estimated. This will involve using ALL the variables that you brought to this project.

(a) If you pre-difference transformed your variables (i.e., took log or square root), then use the log or square root forms. Follow these steps.

- By now, everybody's paper should have page numbers, plots scaled down so that they show the detail carefully without occupying the whole page, all text following other text without big blank spaces, tables with table num- bers and captions, Figures with Figure numbers and captions, references with [] and citations with [] .
- Start a new section in your paper, Section V. This new section will be Section V. Vector Autoregression. Create subsections (e.g. Section V.1, Section V.2.....) for each of the topics requested below.
- First of all, summarize the differencing that you had to do on all your variables to make them stationary. Provide in one plot the final ACF of each, to convince us that they are indeed stationary. On the title of your plot, the backshift notation indicating the differencing done must be provided. Also, create a little new table and number and caption it saying what was done in polynomial notation to each variable in order to make it stationary.
- Provide plots of the cross-correlations of the target variable with all the other variables. Make sure labels, captions and titles all help identify what you are plotting at the outset.
- Summarize the findings of the cross-correlation analysis of your stationary time series in a table. You should be able to make comments such as target affects x1, e.g., but x1 does not affect target. Provide the hypothetical relationships or models deduced. As in the lecture notes. Conduct unit root tests of the target and each independent variable. Do cointegration tests of the target against each independent variable as well. Provide conclusions. Put the conclusions in a table. Fit an appopriate VAR(p) and justify it. Use the ar command of the library tseries to find out what R thinks is the best (AIC based) VAR model to fit to your variables. Pay attention to lecture notes slides. You must specify the variables combined. Use the VAR command of the vars library to fit the model suggested by the ar command. This will give you the standard errors and significance of the coefficients.
- Analyze the residuals of the final model. Cross-ACF should be bivariate white noise and ACFs should be white noise. Comment on all the attempts you made to fit a model and what ended up being the successful one.
- Write the final model in equation form as shown in the notes and keys posted. Mark with an asterisk if statistically significant at level 0.05, two asterisks if at 0.001 or less. The models must be written as indicated in my notes, equation form (See Chicken and eggs article, for example). Do impulse response analysis by shocking each of the variables separately. Provide the plots and conclusions. How long will take the dependent variable to stop responding to the shock? In particular, we are interested in seeing what happens to your dependent variable if there is a shock to one of the other variables. So give a shock to each of the variables and look at the impulse response function of the target. But also shock the target. Comment on the dynamic behavior of the system. Forecast your target variable, then put in the forecast table the values of the final forecasts (notice that you will have to undo all transformartions done) and then calculate the MSE and put it at the bottom of the column
- There will be asection on cross-correlations, another section on unit root tests and cointegration tests, another section on the fitting of the VAR, another section on the impulse response functions and another section on the forecasts. Interpret the results of your system of equations. Be specific as to what variables lead, which variables lag, and what are the interrelations between the variables.
- Upload the .pdf version of the whole paper, with all the sections again in the space provided. Address in this updated paper the comments I made in previous installments if you have not done so yet. The filename

should be YOURLASTNAME-ID.pdf (Note, you will get points deducted if you do not write the filename that way. Upload the R script code for the paper (including the one you uploaded for sections 1 and 2, 3, 4). The name of the file should have YOURLASTNAME-ID.R. Separate the code by sections. If I have to spend hours trying to figure out what each part of your code is doing, where everything is, you will lose a lot of points. Be organized, put headings such as