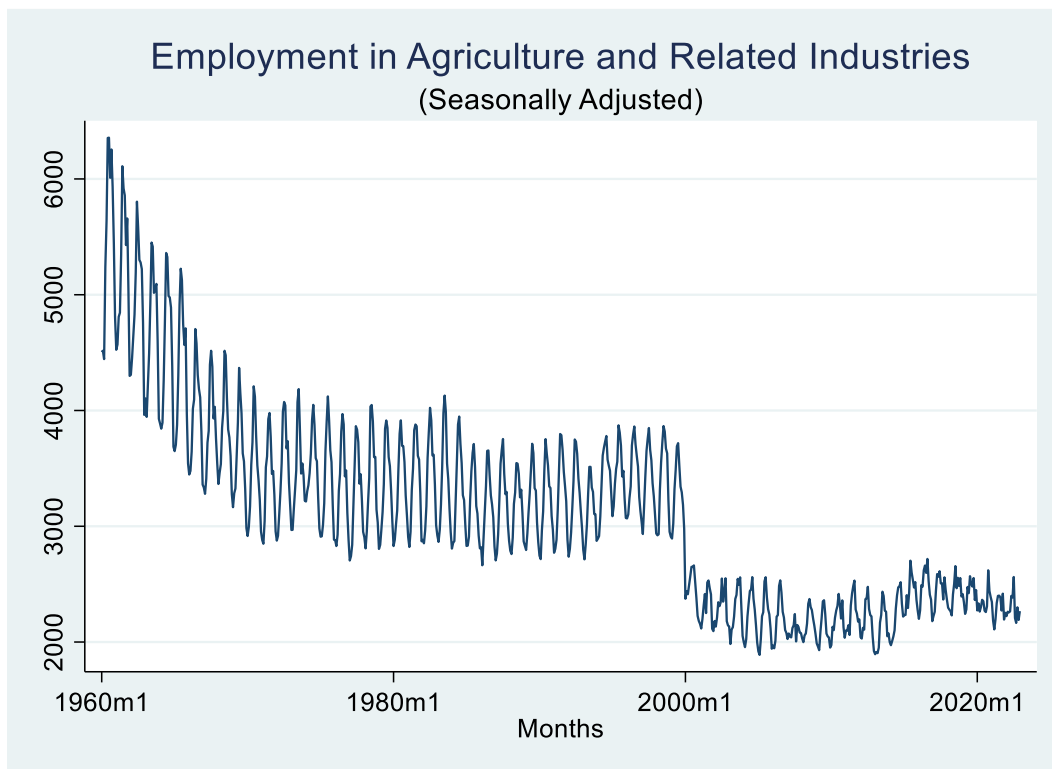


## HOMEWORK 1

### QUESTIONS

1. The data in the attached file titled “hw1\_q1\_agemp” refer to the “Employment Level - Agriculture and Related Industries” in thousands of persons in the USA. They are monthly and seasonally adjusted. They are downloaded from the FRED site of the St Louis Federal reserve. The specific code for the data is LNS12034560. Answer the following questions by using these data:
  - a. Replicate the following graph with ALL its features: [Hints: **i)** *Make sure you pay attention to which sheet you import the data from into the econometric software; and also what portion of the data.* **ii)** *Maybe after you are done with the assignment, try to go to the FRED site to download the data yourself. That helps you to familiarize yourself with a useful data site]*



b. Comment on the trend of the data series, i.e., do you see a clear trend; and what's going on over time? Relate your observations to developments in the agriculture sector, i.e., is agriculture a booming sector in the USA based on the observations of the above data? Why or why not?

c. Restrict your sample to "January, 2018 to December, 2018." Plot the data, and comment on graph. For example, do you see an impact of months? [You are allowed to choose EViews specifically here, if you are using a different software, to quickly plot the seasonal graph via the "seasplot" command.

2. The data in hw1\_q2\_macro also come from the St Louis Federal Reserves' FRED database. The explanations of the variables, in particular, *cpi*, *gdp*, and *tax* are in the identically named sheets of the file. I collected and cleaned the data in Sheet All. By importing these data into an econometric package, answer the following questions:

a. First of all, convert *gdp* and *tax* to their real equivalents by deflating them via *cpi* (like  $rgdp = gdp/cpi$  and  $rtax = tax/cpi$ ). Secondly, generate new variables for *gdp* and *tax* by taking the logarithms of the real variables (like  $lrgdp = \log(rgdp)$  and  $lrtax = \log(rtax)$ ). Then, do TWO graphs; one is time series graph in which both *lrgdp* and *lrtax* (or whatever you named them) in the same graph. The second one is an XY graph in which *lrtax* is placed on the vertical axis and *lrgdp* on the horizontal axis.

- b. Comment on the relationship between  $lrtax$  and  $lrgdp$ . Do the pictures correspond to the theoretical expectations?
- c. Regress  $lrtax$  against a constant and  $lrgdp$ . Are the coefficients on the independent variables statistically significant at 5% level of significance? How do you conclude so? Also, how much does the model explain the issue at hand, i.e., what is the  $R^2$ ? Additionally, comment on the residuals from this estimation. Do not forget to provide a plot of the residuals.