Econ 702
Spring, 2020
C. Engel

Homework 1

1. Download quarterly, seasonal adjusted data on real GDP, real Private final consumption expenditure, and real Gross Fixed Capital formation (Investment) of France for the period 1960Q1-2019Q2. All of this data can be downloaded from FRED, the Federal Reserve Bank of St. Louis data base: https://fred.stlouisfed.org/
    (Note: For the following questions, you don't need to report data series in a spreadsheet. When you plot the series, be sure to label the graphs and put explanatory notes for the graphs.)

    a. Take the natural logarithm of each series and plot each against time. Which series appears to move around the most? Which series appears to move the least?

    b. The growth rate of a random variable x, between dates $t - 1$ and t is defined as $g_t^x = \frac{x_t - x_{t-1}}{x_{t-1}}$. Calculate and plot the growth rate of each of the three series (using the raw series, not the logged series) and write down the average growth rate of each series over the entire sample period. Are the average growth rates of each series approximately the same?

    c. In Appendix A of textbook, the authors show that the first difference of the log is approximately equal to the growth rate: $g_t^x \approx \ln x_t - \ln x_{t-1}$. Compute and plot the approximate growth rate of each series this way. Comment on the quality of the approximation.

    d. The standard deviation of a series of random variables is a measure of how much the variable jumps around about its mean. Take the time series standard deviation of the growth rates of the three series mentioned above and rank them in terms of magnitude.

    e. A popular definition of a recession is a period of time in which real GDP declines for at least two consecutive quarters. Using this consecutive quarter decline definition, find and report recession dates for the entire post-war period.

    f. During the Global financial crisis, France has entered the recession in the second quarter of 2008. Compute and report the average growth rate of real GDP for the period 2003Q1-2008Q1. Compute a counterfactual time path of the level of real GDP if it had grown at that rate over the period 2008Q2-2010Q4. Visually compare the counterfactual time path of GDP with the actual time path of GDP in one graph, and comment (intelligently) on the cost of the recession.