

Homework #2

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Question 1

Debates about many important issues involve references to statistics. Many statistics that you hear from the media may or may not be correct. As an economist, however, you should be able to obtain some of such relevant data, conduct your own analysis, and evaluate some of the claims on your own. Below is a short list of the statistics regarding economic conditions under President Obama.

1. Lowest labor force participation rate since 1970s
2. Almost 95M Americans out of the labor force
3. Worst economic recovery since 1940s
4. Lowest home ownership rate in 51 years
5. Almost 13M more Americans on food stamps (Note that food stamps are called SNAP now)

Try your best to find and download the data corresponding using the `quantmod()` package (try read the help file yourself).

But here let me give you an example first. Suppose that you are interested in **Civilian Labor Force Participation Rate**. Google “fred lowest labor force participation”. You will be led to the website <https://fred.stlouisfed.org/series/CIVPART>. The last part of the web address is the name of the data for labor force participation rates. And you can obtain by typing the following command

```
library(quantmod)
getSymbols('CIVPART',src='FRED')
```

```
## [1] "CIVPART"
```

Plot the graph for each variable and evaluate these claims. Also, present them in a coherent way to show your own view of economic conditions under President Obama. Do we have the data for Trump’s administration? If so, how about them?

Question 2. [Learn How to Conduct Preliminary Analysis of Time Series Data]

Recently the White House published a report on the trend of male labor force participation. See report [here](#).

The share of men between the ages of 25 and 54 either working or actively seeking work has been falling for more than 60 years. The decline in participation has been roughly constant over much of this time horizon. As Figure 1 shows, participation among prime-age men peaked in 1954, declined only slightly until the mid-1960s, but then began to decline in earnest in the decade between 1965 and 1975, when the share in the labor force fell from 96.7 percent to 94.2 percent. Since then, participation has fallen persistently, with sharper declines in recessionary periods, such as the early 1990s, that were not fully reversed in the subsequent expansion periods. Since 1965, the prime-age male labor force participation rate has fallen by an average of 0.16 percentage point each year, totaling an 8.3 percentage-point decline as of May 2016

1. Obtain seasonally adjusted male labor force participation from St. Louis Fed’s website.
2. Plot the time series.
3. Can you replicate some of the figures in this paragraph? Please fill in your numbers in four decimals, if possible.

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between 1965 and 1975, when the share in the labor force fell from _____ percent to _____ percent. Since then, participation has fallen persistently, with sharper declines in recessionary periods, such as the early 1990s, that were not fully reversed in the subsequent expansion periods. Since 1965, the prime-age male labor force participation rate has fallen by an average of _____ percentage point each year, totaling an _____ percentage-point decline as of May 2016.

4. Examining the time series plot, which component(s) of the variable are more distinct?
5. Use the classical decomposition method to separate these distinct components.
6. Using your answer to (4), what do you think next period's male labor force participation rate would be, roughly speaking?
7. Now, obtain the labor force participation rates for women. Pretend that you are a government official who is going to write a separate report on women. Use the data, plot it, and summarize its patterns. Finally describe its evolution over time using similar language as the one for men above.

Question 3. [Learn How to Use simple forecasting methods] Use data on male labor force participation rates from the pre-Trump period and obtain forecasts for the Trump period using the following methods and compare them to the true values.

1. Average Method
2. Naive Method
3. Seasonal Naive Method
4. Drift Method
5. Naive Drift Method (suggested by Yandong and Heather in class)

Also, use only the data from the George W. Bush era. How would your results change?

Question 4. [Learn How to Use a Multiplicative Model to Decompose Time Series] In class we illustrate how to use the classical decomposition method to isolate different components in time series. The default is an **additive** model.

1. Obtain unemployment rates **without** seasonality adjustments.
2. Use a multiplicative model to decompose this variable, and plot the results.
3. Use the decomposition results, generate and plot a new variable that is free of the random component.
Hint: Note that in case of multiplicative models, the answer is slightly different from the one that we discussed in class.
4. Also use the STL method to decompose the time series.