

Econ 100B: Economic Analysis – Macroeconomics
Problem Set #6
Due Date: October 16, 2020

General Instructions:

- Please upload a PDF of your problem set to Gradescope by 11:00 pm.
- **Late homework will not be accepted.**
- Please put your name and student ID at the upper right corner of the front page.

1. Comparing the output and unemployment gaps shown on slide 25 of lecture 10:
 - (a) Would you characterize the direction of these fluctuations as generally procyclical, countercyclical, or acyclical? Why?
 - (b) Many of the relationships in our macroeconomic models are linear; two variables are related by the equation for a straight line $y = mx + b$. What is the relationship between (i) the sign of the slope m and (ii) the cyclicity (pro or counter) seen in a time series? Briefly explain.
2. The goal of this exercise is to estimate Okun's law using data from the Federal Reserve. Download the following time-series from FRED:¹
 - The civilian unemployment rate (UNRATENSA): U .
 - The natural rate of unemployment (NROU): U_N .
 - Real gross domestic product (GDPC1): Y .
 - Real potential gross domestic product (GDPPOT): Y^P .
 - (a) From these time series calculate and plot the unemployment gap, $U - U_N$, and the output gap $100 \times (Y - Y^P)/Y^P$ as a function of time (and on a quarterly basis) from the first quarter of 1949 to the most recent data available. Your graph should look similar to the graph on slide 25 of lecture 10.
 - (b) Create a scatter plot of the unemployment gap as a function of the output gap. Your graph should look *similar to* the graph on slide 26 of lecture 10. *Note: you'll need to extend the axes shown in class to get the most recent data point onto the graph.*
 - (c) Perform a linear regression on the data in the graph you generated for Question (2b) and show the regression result as a line on your graph. (*Note: The regression method you used in the analysis of the Cobb-Douglas data can be used here.*)
 - (d) Does your regression analysis support the equation for Okun's Law discussed in class? Why?

¹For purposes of this exercise we will ignore the seasonality inconsistency in the GDP measures.

3. Write out the steps in the derivation of the optimal rate rule given on slides 6–9 of lecture 11. In your derivation include comments that explain what you are doing.
4. The current Fed Funds rate band is 0.0%/year – 0.25%/year. If the Federal reserve wanted to set their policy rate to 0.10%/year using a 2-day reverse repo transaction, how much would a commercial bank pay to buy back \$65 million worth of bonds?