

# ECON 3010 Intermediate Macroeconomic Theory

## Solutions to Homework #1

Due: Thursday, February 13, 2020

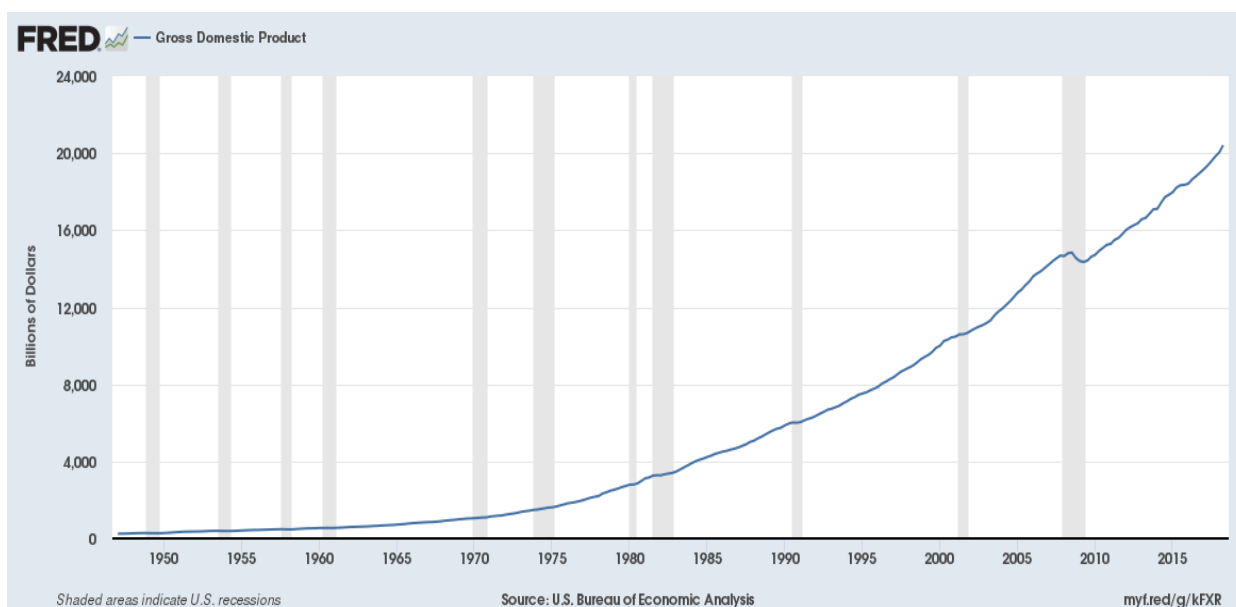
#1. Ten *Sapling* multiple-choice questions. You have unlimited attempts to complete the assignment and they are due at midnight on the date above.

**The written questions below are due at the beginning of class and should be typed.**

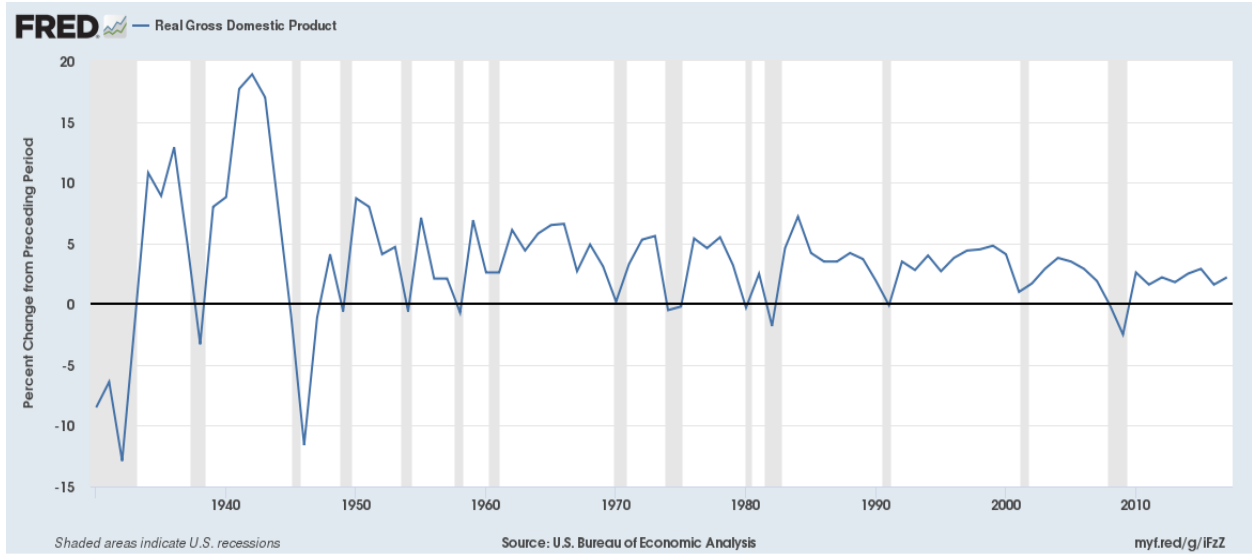
#2. Go to the Federal Reserve Economic Database ([www.research.stlouisfed.org/fred2/](http://www.research.stlouisfed.org/fred2/)) and print out graphs for the following five macroeconomic time series:

- Nominal GDP (Hint: FRED does not use the terminology ‘nominal’.)
  - Annual real GDP growth rate
  - GDP deflator
  - Annual CPI growth rate
  - Unemployment rate
- a) For each variable, provide enough information about the time series that someone could find the exact data in FRED and replicate the graph (e.g., sample period, seasonal adjustment, frequency, etc.). Use the longest sample period available on FRED.
- b) For each variable, discuss one key feature of how the variable moves over time. There is no right or wrong answer here; just your opinion based on looking at the graph.

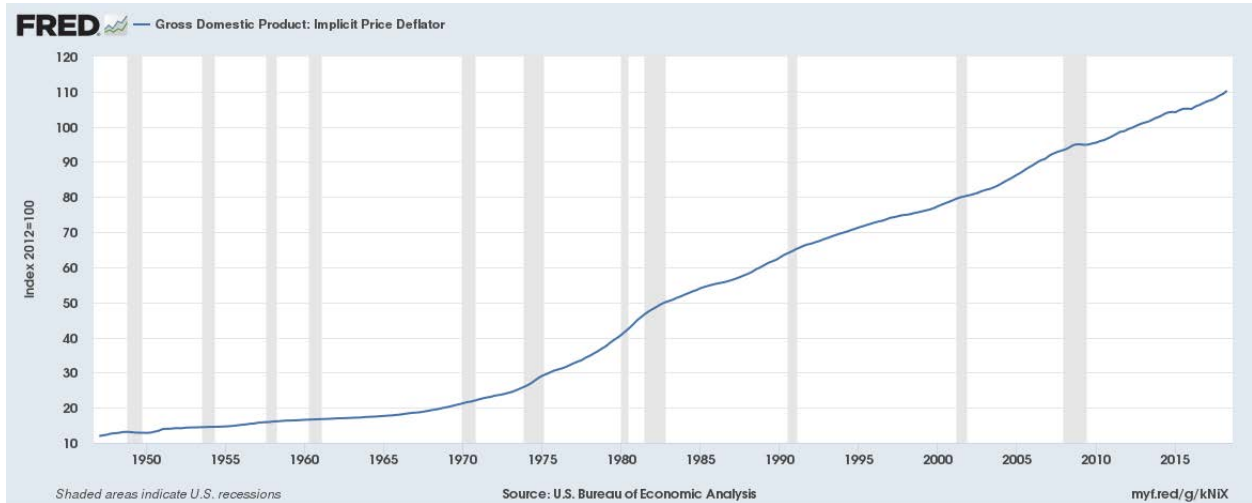
Quarterly, Seasonally Adjusted Annual Rate, GDP, Billions of Current Dollars



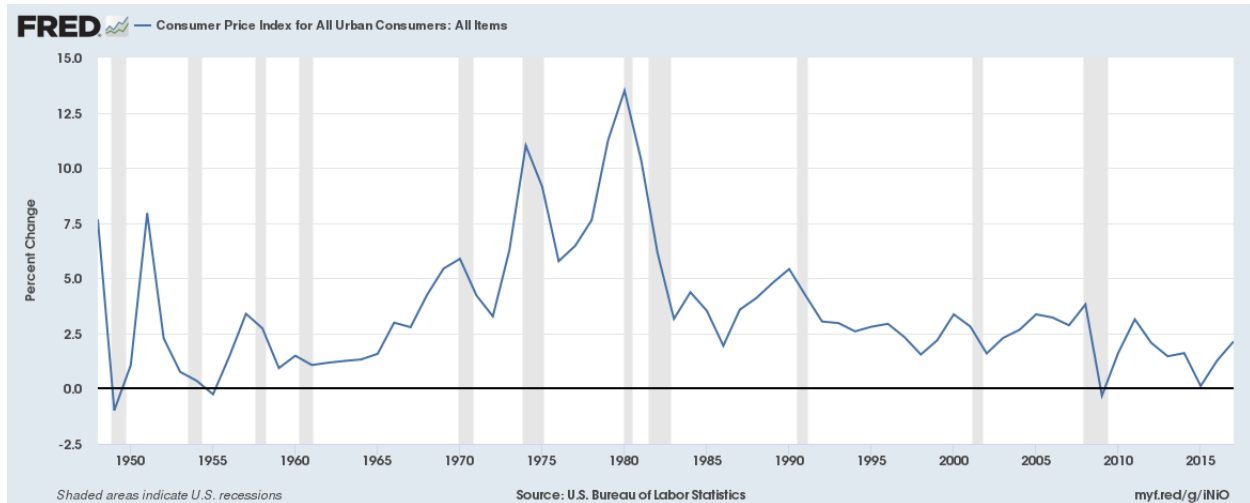
## Annual, Not Seasonally Adjusted, Annual Real GDP Growth Rate



## Quarterly, Seasonally Adjusted, GDP Implicit Price Deflator



## Annual, Seasonally Adjusted, CPI Growth Rate



## Monthly, Seasonally Adjusted, Civilian Unemployment Rate



### #3. Chapter 2. Problems and Applications #7.

a.

**2010 (Base year)**

$$\text{Nominal GDP} = (200 \times \$2) + (200 \times \$3) = \$1000$$

$$\text{Real GDP} = (200 \times \$2) + (200 \times \$3) = \$1000$$

$$\text{GDP Deflator} = (\$1000/\$1000) \times 100 = 100$$

$$\text{CPI} = (\$1000/\$1000) \times 100 = 100$$

**2015**

$$\text{Nominal GDP} = (250 \times \$4) + (500 \times \$4) = \$3000$$

$$\text{Real GDP} = (250 \times \$2) + (500 \times \$3) = \$2000$$

$$\text{GDP Deflator} = (\$3000/\$2000) \times 100 = 150$$

$$\text{CPI} = (\$1600/\$1000) \times 100 = 160$$

b.

$$\text{Price increase Hot Dogs} = (\$4 - \$2)/\$2 \times 100 = 100\%$$

$$\text{Price Increase for Hamburgers} = (\$4 - \$3)/\$3 \times 100 = 33.33\%$$

$$\text{GDP Deflator Inflation Rate 2015} = ((150 - 100)/100) \times 100 = 50\%$$

$$\text{CPI Inflation Rate 2015} = ((160 - 100)/100) \times 100 = 60\%$$

The increase was greater for the CPI (Laspeyres Index) because the basket of goods is fixed. Notice that the price increase was greater for hot dogs than hamburgers. Rational consumers will substitute away from hot dogs towards hamburgers. This substitution effect is captured by the GDP deflator (Paasche Index), but not the CPI.

#4. Go to FRED and find the most recent data on the labor force, population, and unemployed. Use these figures to calculate *i*) the labor force participation rate and *ii*) the unemployment rate. Do your figures match the rates presented by the U.S. Bureau of Labor Statistics?

**Solution.** As of January 2020, FRED and the BLS have ...

- Labor force = 164,606,000
- Population = 259,502,000
- Unemployed = 5,892,000

Using these numbers, we can calculate ....

- The labor force participation rate is  $164,606,000/259,502,000 = 63.43\%$
- The unemployment rate is  $5,892,000/164,606,000 = 3.6\%$

Yes, these figures match those on the BLS website.