Macroeconomics Research Project I
National Income and Economic Growth

In this project, our task is threefold: 1) examine the time series patterns of the U.S. GDP statistics and verify its calculations and components in the statistics; 2) examine and compare the two different approaches to compiling GDP statistics; 3) compare GDP statistics between two countries as well as their economic growth rates. Follow the seven steps below and download relevant dataset.

1. Review lectures on national income measurements and economic growth.
2. Access National Account Database http://unstats.un.org/unsd/snaama/selCountry.asp
   Definitions of the statistics https://unstats.un.org/unsd/snaama/Metadata/Glossary#
3. Select Country: United States
   Select Series: Gross Domestic Product (GDP)
   Select Years: ALL 1970 - 2020
   Submit selection and download the data in a spreadsheet.
4. Open a new spreadsheet file, download the following three series from "GDP by Kind of Expenditure" series for 1970 to 2020: "at constant 2015 prices - US Dollars", "Annual Rate of Growth – Percentage", and "Percentage Distribution (Shares)".
5. Open another new spreadsheet, download the following four series from the item "Value Added by Economic Activity" series for 1970 to 2020: "at constant 2015 prices - US Dollars", "Annual Rate of Growth – Percentage", and "Percentage Distribution (Shares)".
6. Select another country of your interest and download the "Gross Domestic Product" series in a new spreadsheet, as in step 3.
7. Select Country: United States
   Select Series: Gross National Income (GNI-US Dollar)
   Select Years: ALL 1970 - 2020
   Submit selection and download the data in a spreadsheet.

I. U.S. GDP Statistics: Measurements, Components, and Growth

1. Compare "GDP at current prices" series and "GDP at constant 2015 prices" series.
   a. Apply Excel line chart function to display their time trends in one graph.
   b. What patterns can be observed? Interpret their similarities and differences.
   c. Which one is the nominal GDP? The real GDP? How are they different in theory and practice?
   d. Which series is a more reliable indicator of national income of United States? Explain in detail.
   e. From the real GDP series, in what periods has U.S. experienced recession and longest expansion?

2. In the spreadsheet, apply the percentage growth rate formula to calculate the annual growth rate for "GDP at current prices" series and for "GDP at constant 2015 prices" series, examine their properties.
   a. What patterns can be observed? Which series is a more reliable indicator of economic growth?

b. Calculate the annual GDP growth rate in the spreadsheet using the "GDP at constant 2015 prices" and plot its trend.
c. Check your calculations in (b) with the "Growth Rate" series from the data. Are they identical?
d. Based on the calculation, in what years is U.S. economy in recession? In expansion?
e. Calculate the long run average annual GDP growth rate for the period 1970 to 2020.

3. Decompose the U.S. GDP statistics: the expenditure V.S. value added approach
a. Verify the series in the dataset downloaded in step 4 with the GDP accounting identity. Refer to the website glossary, what are the items in the dataset corresponding to C, G, I, and NX.
b. In 2020, use the numbers to verify the accounting identity GDP=C+I+G+NX. Can you add up the components to match the GDP series? (Hint: An easier way is to check whether the share of each GDP component sum up to 100.)
c. Plot the time trends for percentage distribution of C, I, G, and NX in a single graph. What patterns can be observed in terms of the structure of aggregate demand? What are the economic implications for the sizes of private and public sectors?
d. Examine the "Value Added" dataset from step 5, can the "Total Value Added" series match the GDP series? Which is the most important industrial sector? Which is the most volatile sector over the years? How do you explain these facts?

4. U.S. GDP versus GNI: Employ the data from step 7 on page one. What is the difference between GDP and GNI? Which variable is more reliable in measuring U.S. economic size? Plot the two series in one graph and comment on their differences. Is the GNI data measured in current prices or constant prices? How do you verify?

II. International comparison of GDP, GNP, and economic growth 1970-2020

1. Choose another country of your interest and compare its "Per Capita GDP" with the U.S.
a. Plot the two time trends in a single graph. Comment on the patterns you observe.
b. Which country has higher GDP over the years? GDP per capita?
c. Do high GDP countries also have high GDP per capita? Why or why not? List some other examples.
2. Compare another country's GDP growth rate with the U.S. GDP growth rate
a. Plot the two time trends in a single graph. Comment on the patterns you observe.
b. On average, which country has higher GDP over the years? Which has higher GDP growth rate?
c. Do the high GDP countries have a low GDP growth rate? Why or why not? How can the low GDP countries catch up with high GDP countries? List some examples.
3. Compare another country's "Growth rate of per capita GDP at constant 2015 prices" with the U.S.
a. Plot their time trends in a single graph. What patterns can be observed?
b. What is relation between the GDP per capita growth rate and GDP growth rate?
c. Can you calculate the population growth rates for the two comparison countries from 2 and 3?