

ECON 3123: Macroeconomics  
Problem Set #1  
Due Date: March 10, 2020

Instructions:

- Please upload your answers on Gradescope by 10:00 pm.
- Late submissions will not be accepted.
- The following clip on how to submit your homework may be useful. ([LINK](#))
- Please put your name and student ID at the upper right corner of the first page.

**1. Real GDP and the GDP deflator:**

In this exercise, you will generate a graph of nominal and real GDP in Hong Kong, calculate the growth rate of real GDP, and compute the inflation rate based on the GDP deflator. This exercise is designed to enhance your data-handling skills and to review the relationship between major macroeconomic variables.

(a) Download data on nominal and real GDP in Hong Kong from the following page (<https://www.censtatd.gov.hk/hkstat/sub/sp250.jsp?tableID=030&ID=0&productType=8>).

You can click “Customize Statistical Table,” select “GDP-At current market prices in HK\$ million,” “GDP-Chained (2017) dollars in HK\$ million,” and “All Years,” press “Submit,” and use “Export Excel” menu. Create a chart similar to Figure 2-1 in our textbook using the downloaded data for Hong Kong.

(b) Compute the growth rate of real GDP from 1962 to 2018. Express them in percent by multiplying 100. What is the growth rate of real GDP in Hong Kong, on average, during the period? (HINT: Use ‘average’ function in Excel.)

(c) Calculate the GDP deflator,  $P_t$ , and the inflation rate,  $\pi_t$ , which is defined as  $\frac{P_t - P_{t-1}}{P_{t-1}}$ .

Sometimes, economists use  $\Delta \ln(P_t) = \ln(P_t) - \ln(P_{t-1})$  to compute the inflation rate, where  $\ln(\cdot)$  is a natural logarithm. Derive the inflation rate using both methods and compare the results. Do you find that they are similar?

## 2. The composition of HK GDP, 2016:

- (a) Using data provided by Census and Statistics Department, the Government of the Hong Kong Special Administrative Region, fill in the following table. Specifically, you may want to look at “Table 031: GDP and its main expenditure components at current market prices.”

(<https://www.censtatd.gov.hk/hkstat/sub/sp250.jsp?tableID=031&ID=0&productType=8>)

	Millions of HKD, 2016	Percent of GDP
GDP (Y)		
Consumption (C)		
Investment (I)		
Government spending (G)		
Net Exports (NX)		
Exports (X)		
Imports (IM)		
Inventory investment		

- (b) Among C, I, G, and NX, what is the largest component of GDP in Hong Kong?
- (c) A widely used measure of trade openness is the openness index, which is given by  $\frac{X+IM}{Y}$ . Calculate the index of the Hong Kong economy in 2016. Compare your answer with that of the US economy in 2016, 26.5%.
- (d) (Industry-wise decomposition) Check out “Table 036 : Gross Domestic Product (GDP) by major economic activity - percentage contribution to GDP at basic prices.” (<https://www.censtatd.gov.hk/hkstat/sub/sp250.jsp?tableID=036&ID=0&productType=8>) What is the most important industry in Hong Kong among the five sectors listed in the table?

### 3. The employment rate:

First, see the following definition of the employment rate from the OECD.  
(<https://data.oecd.org/emp/employment-rate.htm>)

*Employment rates are defined as a measure of the extent to which available labour resources (people available to work) are being used. They are calculated as the ratio of the employed to the working age population.*

Suppose that the participation and unemployment rates are 80% and 10% in an economy, respectively. What is the employment rate in this economy?

### 4. (Blanchard (2017), #2-5 on p.85)

The following equations refer to the goods market of an economy in billions of euros:

$$C = 480 + 0.5Y_D$$

$$I = 110$$

$$T = 70$$

$$G = 250$$

- (a) Solve for the goods market equilibrium.
- (b) Find equilibrium disposable income ( $Y_D$ ).
- (c) Find equilibrium consumption ( $C$ ).
- (d) Calculate the private savings, public savings, and investment spending.
- (e) Calculate the multipliers in the following cases.
  - (i) The government increases  $G$  by one unit, while  $T$  does not change  $\left(\frac{\Delta Y}{\Delta G}\right)$ .
  - (ii) The government increases  $T$  by one unit, while  $G$  does not change  $\left(\frac{\Delta Y}{\Delta T}\right)$ .
  - (iii) The government increases  $G$  and  $T$  by one unit  $\left(\frac{\Delta Y}{\Delta G} \mid_{\Delta G = \Delta T}\right)$ .
- (f) Now, suppose that taxes depend on the level of income. Specifically, consider the following equation for taxes:

$$T = -252 + 0.2Y.$$

Recalculate the government spending multiplier.

- (g) Why is fiscal policy in this case called an automatic stabilizer?