Problem sets 1: Data and measuring business cycles

EE312: Intermediate macroeconomics

Semester 1/2018

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Due on January 30th ,2019 at the BE office. (before 3 pm)

1. Consider an economy with two production sectors, namely private consumption sector (PCS) and private investment sector (PIS). The below tables give the total production and price of both sectors in 2017 and 2018. Consider the following problem

Consumption goods

Year	Wine		Cheese	
	price	units	price	units
2017	6	100	10	150
2018	8	100	2	400

Investment goods

Year	Computer		Truck	
	price	units	price	units
2017	200	4	50	13
2018	260	5	60	15

   a. Calculate nominal consumption, investment and GDP for 2017 and 2018
   b. Calculate the fixed-base year real consumption using 2017 as the base year. Calculate the private consumption deflator.
   c. Calculate the fixed-base year real investment using 2017 as the base year. Calculate the private investment deflator.
   d. Calculate the fixed-base year real GDP using 2017 as the base year. Calculate the GDP deflator.
   e. Does the real GDP equal to the sum between real consumption and real investment?
   f. Redo "b" using the Chain-weighted method
   g. Redo "c" using the Chain-weighted method
   h. Redo "d" using the Chain-weighted method
   i. Reconsider your conclusion obtained in "e" when the Chain-weighted method is used instead.

2. As we discussed in class, the CPI is calculated for a fixed market basket. It measures the change in the cost of the market basket from the base year until the current year. An index with the market basket fixed in the first year, like the CPI, is technically called a *Laspeyres index*. An alternative index, the *Paasche Index*, is based on a market basket in the end year. It measures the change in the cost of a market basket fixed in the end year. Suppose that the base is 2017, and further that the market basket contains only two items, wine and cheese, and the quantities consumed and prices in 2017 and 2018 are

Year	Wine		Cheese	
	price	units	price	units
2017	0.5	50	1	100
2018	2	45	1.2	150

   a. Calculate the rate of inflation for the Laspeyres (CPI) index and the Paasche Index.
   b. Workers often receive an adjustment in their wages equal to only a fraction of inflation as calculated using the CPI. In view of the preceding analysis, explain why workers would likely be better off than they were before if they were fully compensated for inflation. Would this also be the case if inflation was calculated using the Paasche index?
   c. Calculate the CPI inflation using the ideal Fisher index method

3. Working with the real DATA

We will go through and analyze this problem using the real data. The excel file posted in the Moodle folder contains some data set downloaded from the CEIC database. The file has three sheets, namely "CEIC_data", "data_definition", and "USED_data". The first contains all the raw data originally downloaded from the CEIC. (you can disregard the sheet.) The second sheet lists down all the key variable names with the definition of each one provided. The third sheet gives you the data that covers the period between 1993 and 2018 (the third quarter). Consider the following questions (some of the questions will require your excel skillset.)

a) If we plot the series of nominal GDP in the log-scale, what can we then interpret about the slope of the curve?
b) Calculate the Y-o-Y growth of both nominal GDP and real GDP during the past four quarters. What does the difference between the two figures obtained from each quarter imply?
c) Calculate the investment deflator for both equipment and construction. Show the figures for the past four quarters. (In the real data, investment can be divided into two subcomponents, namely equipment and construction. This question is asking you to calculate the deflator for each type of investment.)
d) Calculate the core inflation and non-core inflation using the data between 2000 and 2018. What is the value of the standard deviation of both inflation measures, and its correlation?
e) In the table, we have real GDP data for 5 countries – Thailand, USA, Euro, Australia, Brazil, and Japan. Calculate the Y-o-Y growth of real GDP each country, report the standard deviation of each series and show the pairwise correlation. Use the data between 2000 and 2018.
f) From "e", do you find the perfect correlation among any pairwise figures obtained? Can you attribute this to any reason that might explain the finding? How tightly do Thai GDP growth comove with US GDP growth? Compare with the figure obtained with respect to Japan GDP growth.