

MACROECONOMIC THEORY I  
ECO2142 B  
Fall 2011

**HOMEWORK ASSIGNMENT 1 - Version 2**

**You can choose to complete this homework assignment instead of the one posted in the LaunchPad. You can also choose to complete both, in which case I will use the higher of the two marks that you receive.**

1. (5 points) Consider the National Identity for Canada in 2017. In which expenditure group ( $C$ ,  $I$ ,  $G$ , or  $NX$ ) would the following events be recorded? What is the amount that would be recorded in each case? Explain your answers.

a. In January 2017, Tim Hortons Canada purchased a commercial unit in the ground floor of a 1945 building in downtown Halifax. The unit cost \$200,000. In February 2017, Tim Hortons spent \$30,000 in new equipment and furniture to be placed in the store that they opened in this unit in March 2017.

b. In July 2017, David purchased a new Harley-Davidson motorbike for \$15,000. The motorbike was produced in the Harley-Davidson factory in Milwaukee, Wisconsin. While the paperwork for this purchase was being processed by the Canadian customs, David kept the motorbike parked in a garage in Toronto. The rent of the parking spot cost a total of \$60.

c. Last week, Jason had an hair cut from Philippe, a stylist working at the Salon "Beaux Cheveux" in Quebec City. Philippe is French, but he has been living in Quebec since July. The haircut cost \$45.

d. In June 2017, the City of Ottawa has purchased 20 new bikes to be employed for the new "bike and foot patrol" service of the Ottawa police. The bikes cost \$150 each.

e. Yesterday Pierre left work early to cook dinner for his family and friends. It took Pierre 2 hours to prepare the 3 course dinner. In the city where Pierre lives, the average pay for a cook is \$25/hour.

2. (4 points) Go to the website: <http://research.stlouisfed.org/fred2/categories/32268> (or go to FRED in the webpage of the Federal Reserve Bank of St. Louis, and select International Data and then Canada).

a. Consider the inflation rate for Canada.

i. Look at the CPI data for the first 2 quarters of 2016 (Q1 and Q2); the variable is "Consumer Price Index of All Items in Canada, Quarterly, Not Seasonally Adjusted (CANCPIALLQINMEI)". Transform the CPI index for 2016 Q1 and 2016 Q2 so that the base year is 2016 Q1 (i.e. transform the index so that you have  $CPI_{2016Q1} = 100$ ). Compute the inflation rate for 2016 Q2 using the CPI index for 2016 Q1 and 2016 Q2 with base year 2016 Q1.

ii. Transform the CPI index for 2016 Q1 and 2016 Q2 so that the base year is 2016 Q2 (i.e. transform the index so that you have  $CPI_{2016Q2} = 100$ ). Compute the inflation rate for 2016 Q2 using the CPI index for 2016 Q1 and 2016 Q2 with base year 2016 Q2. Is this inflation rate different from the one that you obtained in point a.i.? (Hint: they should be the same).

b. Consider again the inflation rate for Canada.

i. Look at the GDP deflator data for the first 2 quarters of 2016 (Q1 and Q2); the variable is "GDP implicit price deflator in Canada, Quarterly, Seasonally Adjusted (CANGDPDEFQISMEI)". Using this information, compute the inflation rate for 2016 Q2.

ii. Is the inflation rate computed in b.i. different from the inflation rate that you computed in point a. using the CPI index? If yes, explain the possible reasons of this difference.

c. Consider now GDP for Canada.

i. Look at the Real GDP data for the first 2 quarters of 2016 (Q1 and Q2); the variable is "Gross Domestic Product by Expenditure in Constant Prices: Total Gross Domestic Product for Canada (NAEXKP01CAQ189S)". Using this information, compute the growth rate of Real GDP for 2016 Q2.

ii. Use your answer in c.i to predict the change in the unemployment rate using Okun's law. Use the variable "Unemployment Rate: Aged 15 and Over: All Persons for Canada, Quarterly, Seasonally Adjusted (LRUNTTTTCAQ156S)" to check whether Okun's law holds in Canadian data for the second quarter of 2016. Note: to obtain the annual growth rate just multiply the quarterly growth rate by 4.

3. (6 points) Assume that the world works according to the Classical model. There are only two countries in the world, Country 1 and Country 2, that produce output according to the following Cobb-Douglas production functions:

$$Y_1 = 10 (K_1)^{0.75} (L_1)^{0.25} \quad (\text{Country 1})$$

$$Y_2 = 5 (K_2)^{0.75} (L_2)^{0.25} \quad (\text{Country 2})$$

Country 1 and Country 2 have the same stock of capital:  $K_1 = K_2 = 256$ . Assume that capital cannot be moved from a country to the other. Let  $L_1$  and  $L_2$  denote the workers employed in the production of output in Country 1 and Country 2 respectively. The workers who are citizens of Country 1 are  $L_1^* = 16$ , while the workers who are citizens of Country 2 are  $L_2^* = 154$ .

Recall that with a Cobb-Douglas production function  $Y = AK^\alpha L^{(1-\alpha)}$ , the  $MPL$  is  $(1 - \alpha) AK^\alpha L^{-\alpha}$ .

a. Assume that Country 1 and Country 2 do not allow free mobility of workers, so that  $L_1 = L_1^* = 16$  and  $L_2 = L_2^* = 154$ . Compute the equilibrium real wage in each country,  $(\frac{W}{P})_1$  and  $(\frac{W}{P})_2$ , and the equilibrium levels of output  $Y_1$  and  $Y_2$ . Show all your work.

b. Assume now that these two countries decide to allow free mobility of their citizens. As a consequence, workers will move from one country to the other until the real wage becomes the same in both countries:  $(\frac{W}{P})_1 = (\frac{W}{P})_2$ . How do you expect  $L_1$  and  $L_2$  and the real wages to change in the two countries as a consequence of this decision? Explain your answer using equations, or graphs, or anything else you think might be useful to show your argument.

c. Assume again that these two countries decide to allow free mobility of their citizens as in point b. How do you expect this decision to affect the market for capital in each country? Are the equilibrium real rental rates of capital  $(\frac{R}{P})_1$  and  $(\frac{R}{P})_2$  going to change? Explain your answer using equations, or graphs, or anything else you think might be useful to show your argument.