ECON 222

Macroeconomic Theory I

Fall Term 2009

Assignment 1

Due: Drop Box 2nd Floor Dunning Hall by ***noon October 2nd*** *2009*

No late submissions will be accepted
(One assignment per person)

Remarks: Write clearly and concisely. Devote some time to give the graphs, plots and tables a format easy to understand. Also the way you present your answers matters for the final grade. Even if a question is mainly analytical, ***briefly*** *explain what you are doing, stressing the economic meaning of the various steps. Being able to convey your thoughts effectively is an asset also in real life.*

Question 1: Some Canadian Macroeconomic Data (30 Marks)

This question asks you to retrieve data from E-STAT. Once you have the data, a spreadsheet program such as Microsoft Excel will work well for these purposes.

Access E-STAT from the Queen's Libraries website, following the instructions on the course website (new pdf instructions!).

(Note: If you try this from off-campus, you may need to use the Queen's library webpage and read 'help with off-campus access' if you haven't already set up a 'web-proxy'.)

For parts a), b) and c) retrieve series for Canada, Ontario and Alberta from :

- **Table 384-0002** "Gross domestic product (GDP), expenditure-based, provincial economic accounts, annual (dollars)"
- **Table 383-0010** "Labour statistics consistent with the System of National Accounts, by NAICS, annual"
- **Table 051-0001** "Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual"
- **Table 282-0002** "Labour force survey estimates (LFS), by sex and detailed age group, annual"

(Note: it's going to be easier if you select "the spreadsheet" option, and save the data as Text files one at a time. Then you can import the files in the spreadsheet, and copy the series in the same workbook)

a) Compute real GDP per capita in constant prices of 2002 for Canada, Ontario and Alberta from 1981 to 2008. Plot the three series (over time) in the same graph an briefly comment on their trends. (5)

b) Calculate the growth rate for the three series and the average growth rate using the formula for the compound growth rate which is the following :

$$x_{t+n} = x_t(1+g)^n$$

where: x is the value of the series; the subscripts indicate the year, g is the growth rate and n the number of years. (5)

c) Using the concept of a decomposition of real GDP per capita,

$$\left(\frac{Real\,GDP}{Total\,pop.}\right) = \left(\frac{Real\,GDP}{Worked\,hours}\right) * \left(\frac{Worked\,hours}{Workers}\right) * \left(\frac{Workers}{Pop.\,15-64}\right) * \left(\frac{Pop.\,15-64}{Total\,pop.}\right)$$

$$(Labour\,Productivity) * (Intensity) * (Utilization) * (Profile)$$

compute the growth rate (not the compound one!) for each of these components for Canada, Ontario and Alberta. Report them on a table (with two decimal points) from 1997 to 2007. From these numbers, discuss to which aspects the difference in growth between the two provinces could have been attributable to. (10)

First, read about core inflation from this excerpt of the Bank of Canada :

$$http://www.bankofcanada.ca/en/graphs/notes-1-target.html$$

Then retrieve series **v41690973** and **v41693242** which correspond to total CPI and core CPI.

d) Compute the inflation rate for both series, plot it (over time) for Jan. 1985 to May 2009 and comment on their trends. (5)

e) Split the sample data into two sub-periods: one from Jan. 1985 to Nov. 1993 and one from Dec. 1993 to May 2009, since December 1993 corresponds to the month where the Bank of Canada instituted a 2% inflation-target rate. It was in fact in 1991, that jointly the Government of Canada and the Bank of Canada decided to implement an inflation-target which was set to 3% at that time. Compare the volatilities (standard deviations) of total CPI and core CPI from one sub-period to another. (5)

Question 2: National Accounts and Economic Changes in Iceland (20 Marks)

Iceland has undergone tremendous economic changes during the last decade which appear in its national accounts. The following figures are taken from two different fiscal years (1997 and 2007). Figures are in millions of Icelandic krona.

a) What is Iceland's NFP from 1997 and 2007? (6)

b) Find Iceland's total consumption expenditure (C) and total government consumption expenditure (G) for 1997 and 2007. (14)

	1997	*2007*
Output	526	1300
Investment	104	367
Net exports	2	-140
Current account	-9	-200
Transfers	-238	-4
Interest payments	-12	-65
Government savings	96	307
Tax revenue as a share of GDP	40%	48%

Table 1: Question 2

Question 3: Labour Demand, Supply and the baby boom (30 Marks)

Suppose the production function for Ontario in 2015 is characterized by the following equation:
$Y = A(100N - 2N^2) + 2R$
(Y = output, A = total factor productivity and N = labour in Ontario, R = Natural Resources)

(a) Using calculus derive an expression for aggregate labour demand. (4)

(b) Aggregate labour supply responds to the real wage, w, in the following manner: $N^S = 5 + \frac{w}{5}$
For A = 5, find the real wage, w*, and level of employment, N*, that clear the labour market. (6)

(c) What would happen if the Ice Storm in 1998 caused a baby boom. This baby boom caused the labour supply to increase in 2016 to : (5)

$N^S = 10 + \frac{w}{5}$

Are the original workers better or worse off from the increase in the labour supply created by the baby boom?

(d) Suppose that the increase in the number of children going through school, the quality of education was lower for this cohort. This lower quality reduces productivity and decreases A to 2. Once again find the new market-clearing wage and employment. (5)

(e) Illustrate the answers to (a), (b), (c) and (d) graphically (label all axes) (10).

Question 4a: Factor Productivity and Growth (10 Marks)

The following data give the real GDP (Y), capital (K) and labour (N) for 2000 and 2008 in Kingston assuming that the production function is Cobb-Douglas ($Y = AK^{\alpha_k}N^{\alpha_n}$) where α_k=0.30 and α_n=0.70:

Year	*Y*	*K*	*N*
2000	1400	500	20
2008	3890	600	40

Show what happens to total factor productivity between 2000 and 2008.

Question 4b: Interest and Expected Inflation (10 Marks)

You bought a one-year Canadian Government Savings Bond on September 1, 2008 for $1000. On September 1, 2009 you redeem your bond and receive principal plus interest totaling $ 1400.

i) If the CPI is 135 on September 1, 2008 and 175 on September 1, 2009, what is the real return and nominal return you receive on the bond? (5)

ii) If you expected CPI to increase to 185, what was your expected real interest rate and your expected inflation. (5)