ECON 222
Macroeconomic Theory I
Winter Term 2010/11

Assignment 1
Due: Drop Box 2nd Floor Dunning Hall by ***noon January 28th*** *2011*
No late submissions will be accepted
No group submissions will be accepted
No "Photocopy" answers will be accepted

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 matter 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 CANSIM (Statistics Canada database). Once you have the data, a spreadsheet program such as Microsoft Excel or Open Office will work well for our purposes.

You can access CANSIM through the library website by searching for "Cansim" under "Databases" on the library's home page. Once you connect to CANSIM @ CHASS, you should be able to click on "CANSIM Multidimensional View", and then on "Vital economic and social statistics" to access the data.

(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'.)

In the section "Labour markets" for the period 1986-01-01 to 2006-12-31 retrieve the following 3 series (Seasonally adjusted): Persons in Labour Force (V2062810), Employed Persons (V2062811), Unemployed Persons (V2062814).

(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) Plot the three series (over time) in the same graph and briefly comment on their trends.

b) Using the series above, compute the Canadian unemployment rate and plot it in a graph. Comment briefly on its behaviour.

c) Compute the average unemployment rates for the years 1986, 1996, 2006. Report them on a table (with two decimal points).

Now, relying on the series locator (http://dc.chass.utoronto.ca/cgi-bin/cansimdim/c2_series.pl) retrieve the following 2 series (Seasonally adjusted) for the period 1986-01-01 to 2006-12-31: Population Total (V1), Immigration (V16).

(Note: these data are quarterly, the previous ones were monthly)

d) Using the series above, compute the share of immigrants in the population and plot it in a graph. Comment briefly on its behaviour.

e) Compute the average population and immigration for the years 1986, 1996, and 2006. Compute the growth rates of these two variables for each 10-year period (i.e. the percentage change of the series from 1986 to 1996, and 1996 to 2006). Report them on a table (with two decimal points).

f) Go back to the data you used for point a)-c). Compute the average persons in the labour force for the years 1986, 1996, and 2006. Report in a table the participation rates for these three years, that is the ratio of the persons in the labour force and the total population (*pretending that the total population series refers to people in working age*). Comment briefly on your findings.

Question 2: Employment, Output, Productivity and Inflation (20 Marks)

Part 1)

Assume that in the world there is an Economy where only one good is produced: Compact Discs. Macroeconomic information for this economy is given in Table 1.

a. What was the growth rate of average labour productivity in this economy between 2009 and 2010?

b. What was the inflation rate between 2009 and 2010?

c. What was the unemployment rate in 2009? In 2010?

Part 2)

For 2010 an economy had the nominal quantities (in billions of dollars) and price indexes (1997 = 100) for each category of expenditure reported in Table 2.

a. Calculate the real quantity for each category (to one decimal point).

b. Calculate nominal and real *GDP*.

c. Find the implicit price deflator (1997 = 100).

Question 3: More on Employment, Output, Productivity and Inflation (20 Marks)

Part 1)

In Table 3 you are given information on the consumer price index (CPI), where the values given are those for December 31 of each year. In which year was the inflation rate the highest?

Part 2)

In Table 4 you find figures taken from some Country's national accounts for the fiscal year 2010. Figures are in billions of dollars.

(a) What is the *NFP* for this Country?

(b) Find total consumption expenditure (C) and total government consumption expenditure (G) for 2010.

Question 4: The Aggregate Production Function (30 Marks)

This question focuses on labour productivity, labour demand, and generally on the production function. Assume that the Aggregate Production Function is represented by the following equation:

$$Y = K^{\alpha} N^{\beta} L^{\gamma}$$

Y stands for output, K stands for the capital stock, N stands for the number of people employed, and L stands for the quantity of land used in production. α, β, and γ are parameters whose values are between 0 and 1.

Part 1)

Derive an analytical expression for:

- the marginal product of capital (MPK).
- the marginal product of labour (MPN).
- the marginal product of land (MPL).

Part 2)

- Using a spreadsheet, fix $K = 9$ and $L = 1$. Consider $\alpha = \beta = \gamma = \frac{1}{2}$ and plot the MPN vs. N, for $N = 1, 2, \ldots, 15, 16$.
- Suppose the wage paid to labour is $p_N = \frac{1}{2}$. Find the level of employment (N) in the economy.
- Use calculus to show that (given K and L) the MPN declines as the level of employment (N) increases.
- Using a spreadsheet, fix $L = 1$. Consider $\alpha = 0.7$, $\beta = 0.3$, and $\gamma = 1$ and compute total output for all the pairs shown in Table 5. Report the values in a similar table.

Part 3)

If the markets for the inputs of production are perfectly competitive, their prices are going to be equal to their marginal product. Denote the prices for the services of capital, labour and land with p_K, p_N, and p_L, respectively.

- Derive an expression for the total capital income, the total labour income, and the total land income. That is compute $p_K K$, $p_N N$, and $p_L L$.
- Under which assumption on α, β, and γ these parameters represent the factor shares of output? (Hint: for each input divide the income it commands by total output)

	2009	*2010*
Output (PC's)	8000	9000
Employment	700	800
Unemployed	70	100
Labour force	770	900
Price per	$8.00	$9.00

Table 1: Question 2, Part1

	Nominal Value	*Price Index*
Consumption	423.1	125.1
Fixed investment	112.0	111.0
Government purchases	165.8	123.2
Exports	180.4	100.9
Imports	186.7	97.2
Change in inventories	-3.28	111.0

Table 2: Question 2, Part2

Year	*CPI*
2006	126.1
2007	133.8
2008	137.9
2009	141.9
2010	145.8

Table 3: Question 3, Part1

Variable	*Value*
Y	2120
I	378
NX	90
CA	115
TR	525
INT	50
Government Savings	-80
Tax Revenue as a share of GDP	40%

Table 4: Question 3, Part 2

	K=0	*K=1*	*K=2*	*K=4*	*K=16*
N=0					
N=1					
N=2					
N=4					
N=16					

Table 5: Question 4, Part2