

ECON 222
Macroeconomic Theory I
Winter Term 2009/10

Assignment 1

*Due: Drop Box 2nd Floor Dunning Hall by **noon January 29th 2010***

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 will work well for these 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 "Basic Labour Force Statistics for Canada" for the period 1979-01-01 to 2009-12-01 retrieve the following 4 series (Seasonally adjusted): Participation rate (V2062816), Persons in Labour Force (V2062810), Employed Persons (V2062811), Unemployed Persons (V2062814).

(Note: one possibility is to select the "As a time series, Columns" 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 first series (over time) in a graph and briefly comment on its trends.
- b) Using the series above, get the Canadian unemployment rate and plot it in a graph. Comment briefly on its behaviour.
- c) Compute the average unemployment rates for the years 1979, 1989, 1999, 2009. Report them on a table (with two decimal points).

In the section "Canadian Population" for the period 1988-01-01 to 2009-01-01 retrieve the following series (Seasonally adjusted): Population Total (V1). In the section "Gross Domestic Product (expenditure based)" for the period 1988-01-01 to 2009-01-01 retrieve the following series: GDP at 2002 constant prices (V41707125).

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

- d) Compute the average population and the real GDP for the years 1988, 1998, 2008. Compute the growth rates of these two variables for each 10-year period (i.e. the percentage change from 1988 to 1998, and 1998 to 2008). Report them on a table (with two decimal points).
- e) Compute the real GDP per capita for the years 1988, 1998, 2008. Compute its growth rate for each 10-year period (i.e. the percentage change from 1988 to 1998, and 1998 to 2008). Report them on a table (with two decimal points) together with the real GDP per capita.

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

Assume that in the Economy only two goods are produced: Computers and TV's. Macroeconomic information for this economy is given in Table 1.

- How much is Nominal GDP in 2008 and 2009? What is the percentage change?
- How much is Real GDP in 2008 and 2009, by considering 2008 as the base year? What is the percentage change?
- How much is the GDP deflator in the two years? By what percentage does the price level change from the base year to 2009?
- What was the growth rate of average labour productivity for the whole economy between 2008 and 2009?

Question 3: National Accounting (20 Marks)

In Table 2 you find figures taken from some Country's national accounts for the fiscal year 2009. Figures are in billions of dollars. Find:

- Savings
- Private Savings
- Net Government Income
- Gross National Product
- Net Exports
- Government Interest Payments
- Current Account Balance

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:

$$Y = K^{\alpha} (AN)^{\beta} + (AN)^{\beta} L^{\gamma}$$

Y stands for output, K stands for the capital stock, N stands for the number of people employed, L stands for the quantity of land used in production, and A stands for a measure of labour efficiency. 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 $A = L = 1$. Consider $\alpha = \beta = \gamma = \frac{1}{2}$ and plot the MPN vs. N , for $N = 1, 2, \dots, 15, 16$.
- Suppose the real wage paid to labour is $w = 1$. Again, fix $K = 9$ and $A = L = 1$ and consider $\alpha = \beta = \gamma = \frac{1}{2}$. Find the level of employment (N) in the economy. What happens to the level of employment (N) if labour becomes more productive, for example if $A = 4$?
- Use calculus to show that (given K , L and A) the MPN declines as the level of employment (N) increases.
- Using a spreadsheet, fix $A = 4$ and $L = 1$. Consider $\alpha = 0.65$, $\beta = 0.35$, and $\gamma = 1$ and compute total output for all the pairs shown in Table 3. Report the values in a similar table.

	<i>2008</i>	<i>2009</i>
<i>Output (Computers)</i>	100	101
<i>Output (TV's)</i>	200	201
<i>Employment (Computers)</i>	1000	1100
<i>Employment (TV's)</i>	500	400
<i>Price per Computer</i>	\$1,000	\$900
<i>Price per TV</i>	\$500	\$400

Table 1: Question 2

<i>Variable</i>	<i>Value</i>
<i>Y (GDP)</i>	2000
<i>NFP (Net Factor Payments)</i>	100
<i>C (Consumption)</i>	1400
<i>G (Government Expenditures)</i>	200
<i>PDI (Personal Disposable Income)</i>	1600
<i>I (Investment)</i>	160
<i>T (Taxes)</i>	640
<i>TR (Government Transfers)</i>	130

Table 2: Question 3

	<i>K=0</i>	<i>K=1</i>	<i>K=2</i>	<i>K=4</i>	<i>K=16</i>
<i>N=0</i>					
<i>N=1</i>					
<i>N=2</i>					
<i>N=4</i>					
<i>N=16</i>					

Table 3: Question 4, Part2