

UNIVERSITY OF SASKATCHEWAN
Department of Economics
Economics 214.3
Professor C. Echevarria
PROBLEM SET

1 Introduction

(Sources: *Statistics Canada. National Income and Expenditure Accounts.*)

1. In 1987, unemployment in Canada was 1,167 thousands and 8.9% of the civilian labour force. Canadian population was 25.9 millions. Calculate:
 - (a) The civilian labour force, in thousands and as a percentage of the total population.
 - (b) How many Canadians are there for each Canadian working?

2. Table 1

Billions of current dollars	1988
Personal consumption expenditure	350.256
Government current purchases of goods and services	112.443
Gross investment	132.898
Indirect taxes less subsidies	65.096
Capital consumption allowances	68.392
Personal and corporation income taxes (net)	58.282

Use Table 1 to calculate:

- (a) GDP at market prices.
- (b) GDP at factor cost
- (c) NDP at market prices
- (d) NDP at factor cost
- (e) Value added
- (f) (Net) Domestic Income (at factor cost)
- (g) (Personal) Disposable Income
- (h) Savings

3. Table 2

Year	Price
1976	570
1977	616
1978	671
1979	732
1980	806
1981	906
1982	1004
1983	1062
1984	1109
1985	1152
1986	1200

Table 2 gives the price, in current dollars, of a fixed basket of goods and services purchased by a representative urban Canadian household from 1976 to 1986.

- Using 1981 as the base year, calculate the Consumer Price Index (CPI) and the inflation rate for each year.
- If we choose 1976 as the base year, would you expect to find the inflation rates to rise? (Explain).

4. Table 3

year	Nominal GDP	Implicit deflator
1976	198.0	65.8
1977	217.9	69.9
1978	241.6	74.2
1979	276.1	81.6
1980	309.9	90.2
1981	356.0	100.0
1982	374.4	108.7
1983	405.8	114.1
1984	444.7	117.7
1985	478.0	120.7
1986	504.6	123.6
1987	550.3	129.0
1988	601.5	134.3
1989	648.5	140.8
1990	680.0	147.0

Table 3 lists nominal GDP (in billion of dollars) for Canada between 1976 and 1990 as well as the implicit GDP deflator for each year.

- Calculate Real GDP and Real GDP growth.
- What year had the fastest economic growth?

5. Consider the following fictional economy:

	1990		1991	
	output	price	output	price
cars	100	10	120	10
wheat	50	2	50	1.5
housing	180	30	170	32
meals	75	1	80	1
clothing	100	2	100	2

	1992		1993	
	output	price	output	price
cars	105	12	130	10
wheat	51	2	56	2
housing	160	32	170	30
meals	85	1	90	0.5
clothing	100	1	100	1

- Find nominal GDP for each year.
- Find the GDP Deflator for each year using 1990 as the base year.
- Find the CPI for each year. Use 1990 GDP as your basket of goods
- Find both nominal and real GDP growth over the 4 years using both price indices.

2 Long run (equilibrium)

1. Consider the following fictitious economy;

$$Y = K^{1/2}L^{1/2} \quad (1)$$

$$C = \gamma + c(Y - T) = 100 + 0.8(Y - T) \quad (2)$$

$$I = \frac{6}{r} \quad (3)$$

$$T = \tau + t \cdot Y = 100 + 0.15Y \quad (4)$$

$$G = 500$$

$$K = 1$$

$$L = 4 \text{ million}$$

- (a) Find the equilibrium values of:
- i. National Income (Y)
 - ii. Disposable Income ($Y - T$)
 - iii. Consumption (C)
 - iv. Government Surplus/Deficit
 - v. Investment
 - vi. Interest rate
- (b) In equation (4), τ is called autonomous tax and t is the tax rate. What is the tax rate required to balance the budget? Suppose the tax rate changes from 15% to this percentage. What are the new equilibrium values as per question a)? Compare your results in a) and b).
- (c) In equation (2), γ is called autonomous consumption and c is the marginal propensity to consume. Suppose the marginal propensity to consumption falls to 75%. What are the new equilibrium values as per question a)? Compare your results in a) and c).
2. Suppose that the aggregate production function for the economy is $Y = K^{0.3}L^{0.7}$. We have 1 unit of capital and 100,000 units of labour. The average tax rate is 30%. The consumption is of the form $C = 0.6(Y - T)$
- (a) Calculate income, consumption, investment, taxes, real interest rate, public saving and national saving if $G = 1200$ and $I = 30/r$.
 - (b) Suppose that government consumption increases to 1400. Calculate the same variables. Interpret your results with the aid of a graph.
 - (c) Suppose that investment demand changes so $I = 40/r$. Government consumption is still 1200. Calculate the same variables. Show the changes produced by the increase in investment demand with the aid of a graph.
3. Calculate the multiplier if $rr = 10\%$, $cr = 1/3$ and $e = 1\%$.
- (a) Suppose that the Bank of Canada buys one million dollars in the open market. What happens to the amount of money?
 - (b) What amount of treasury bills does the Bank need to buy if it wants to increase $M1$ by \$10 million?
4. According to Mankiw and Scarth (1995, page 154), in January 1994, the amount of the monetary base in Canada was \$24.8 billions and the amount of $M1$ was \$54 billions. Calculate the $M1$ multiplier as per January 1994.

5. Table 4

Year	Price Index	Gov't Revenue	Gov't Spending
1990	100	100	120
1991	110	110	140
1992	120	120	130
1993	130	130	135
1994	145	140	145

Year	Nominal Deficit	Gov't Debt	Real Gov't. Debt	Real Deficit
1990	-20	20	20	-20
1991				
1992				
1993				
1994				

Complete Table 4 by computing for each year nominal deficit, nominal outstanding government debt, real outstanding government debt and real deficit. (Indicate a deficit or a surplus by a - or + sign).

6. Simulation of deficit reduction.

- (a) The deficit in 1995 is going to be 40 billion, 5.3% of *GDP*. The outstanding debt is 550 billion at the beginning of 1995. Assume the following scenario: a growth rate of nominal *GDP* of 5% and an interest rate of 8%. Assume that Martin is successful in cutting the deficit to 3% in 1997 and does this in two steps (so the deficit in 1996 is 4.15%). The deficit is usually divided in interest of outstanding debt and programs deficit. According to “usually well informed sources” the program spending will be 120 billion in 1995, 115 in 1996 and 112 in 1997.
 - i. Project the following data for 1995, 1996 and 1997: nominal *GDP*, deficit, outstanding debt at the end of the fiscal year, debt as percentage of *GDP*, program spending as percentage of *GDP*, interest on debt, programs deficit (or surplus) and “tax” revenue.
 - ii. Calculate the increase in the average tax rate that we should expect to see in the years to come for this scenario to be true.
- (b) Some financial analysts have stated that a plan to reduce the deficit to 3% in this period is not enough and the deficit should be zero by the year 1997.
 - i. Redo part a) in problem A) with this goal in mind: a zero deficit in 1997 in two steps, which implies a deficit of 2.65% of *GDP* in 1996.

- ii. If cuts in program spending cannot go any further than the expected 120 billion in 1995, 115 in 1996 and 112 in 1997, what is the increase in the average tax rate that would allow a deficit of 2.65% of the *GDP* in 1996? What is the further increase in the average tax rate that would allow a zero in 1997?
- (c) Suppose that, in addition to cutting the deficit to 4.15% in 1996 and 3% in 1997, the government is able to sell Petro-Canada and CNR (Canadian National Railways) for 6 billion at the beginning of 1995. This move does not affect program spending (120 billion in 1995, 115 in 1996 and 112 in 1997) but rather the amount of tax revenue needed.
- i. Calculate the average tax rate needed in each of the three years for the government to meet its goals.
 - ii. Assume that the government is really able to sell the corporations at this price (without a great loss). Is this, in your opinion, a smart move from a financial point of view? Under which conditions would this move be wise or unwise?
7. Let us assume that the production function of our economy is of the Cobb-Douglas form with $\alpha = 1/2$. At the beginning of this period the economy has 100 units of capital and 100 units of available labor. The investment function, the consumption function and the demand for money function are of the following form:

$$C = 2 + 0.6(Y - T)$$

$$I = 65 - 1000r$$

$$\frac{M}{P} = 0.75Y.$$

Suppose that the government spends 35 units of the good produced in our economy and raises 20 units of the same good in taxes; the Central Bank sets the amount of money to 375 units of the currency of the country; and the public expectations are that inflation is going to be 5%.

- (a) Is the money-demand-function representative of the Quantity Theory or of the Liquidity-Preference Theory? What is the velocity of money?
- (b) If the world behaves according to the neoclassical assumptions, what are the level of employment, total output, nominal and real interest rates, consumption, investment, price level, and nominal and real wages?
- (c) Suppose that the Central Bank increases the amount of money from 375 to 425 units of the currency of the country. The government is still spending 35 units of the good produced in the economy. If

the world behaves according to the neoclassical assumptions, what are the new levels of employment, total output, nominal and real interest rates, consumption, investment, and prices?

- (d) Suppose that government spends 40 units of the good, instead of 35. The amount of money is set at 375 units. In the neoclassical case, what are the new levels of employment, total output, nominal and real interest rates, consumption, investment, and prices? Compare with the old ones ($G = 35$ and $M = 375$)
8. The interest rate on Government bonds in Canada is 9%. The interest rate on similar bonds in Spain is 11%. The exchange rate that the public expects to see one year from now is $1C\$ = 91.96 pts$ (pesetas).
- (a) State the interest parity condition. Calculate the exchange rate.
- (b) Suppose now that the exchange rate today is $1C\$ = 91.96 pts$ (pesetas). Calculate the exchange rate that the public expects to see one year from now.
9. The price of Columbian coffee is 100 Columbian pesos per pound and the prize of Brazilian coffee is 4,000 Brazilian cruzados per pound. According to the law of one price, what should be the exchange rate between the Columbian peso and the Brazilian cruzado? (Assume that you cannot differentiate between Brazilian and Columbian coffee).
10. Let us assume now that the economy that we study in problem ?? is a small open economy with flexible exchange rates. The net exports function is of the following form:

$$NX = 15 - 10\varepsilon$$

where ε denotes real exchange rate. Suppose now that the government spends 25 units of the good produced. The real interest rate in the world market is 5%. The price level in Florida (the neighbour country) is 10 Floridian pesos. The currency of this country, Domestica, is called “dollar”.

- (a) If the world behaves according to the neoclassical assumptions, what are the level of employment, total output, nominal and real interest rates, consumption, investment, net exports, real exchange rate, nominal exchange rate of Domestica dollars into Floridian pesos, and price level?
- (b) What happens if money supply increases to 425 units of currency?
- (c) What if government spending increases to 30 units of the national good?

3 Short run (cycles)

1. The following are recent excerpts from the newspapers. Use an AD/AS graph to show the short-run effects on the output, employment level, and general price level of the relevant economy (Canada, US, global, etc.) Assume flexible exchange rates.
 - (a) “Consumer confidence rose last month” (*Globe and Mail*, February 8, 2003)
 - (b) “US economy hit by weather” (*Globe and Mail*, March 27, 2003)
 - (c) “Consumer confidence fell sharply last month” (*Globe and Mail*, March ??, 2003)
 - (d) “War with Iraq will affect the global economy most directly through higher oil prices” (*Wall Street Journal*, March 20, 2003)
 - (e) “Business investment is halting in the U.S., Europe and Japan.” (*Wall Street Journal*, March 20, 2003)
 - (f) “The increase in labour costs is not positive for the employment picture” (*Globe and Mail*, March ??, 2003)
2. What happens to net exports and the real exchange rate in cases **1a** and **1c**?
3. What is the effect of **1e** on the Canadian economy (output, employment level, and general price level)? What happens to net exports and the real exchange rate?
4. Answer questions **1a**, **1c** and **1f** assuming fixed exchange rates rather than flexible exchange rates.
5. What is the effect of **1e** on Canadian output, employment level, and general price level under a fixed exchange rate regime?